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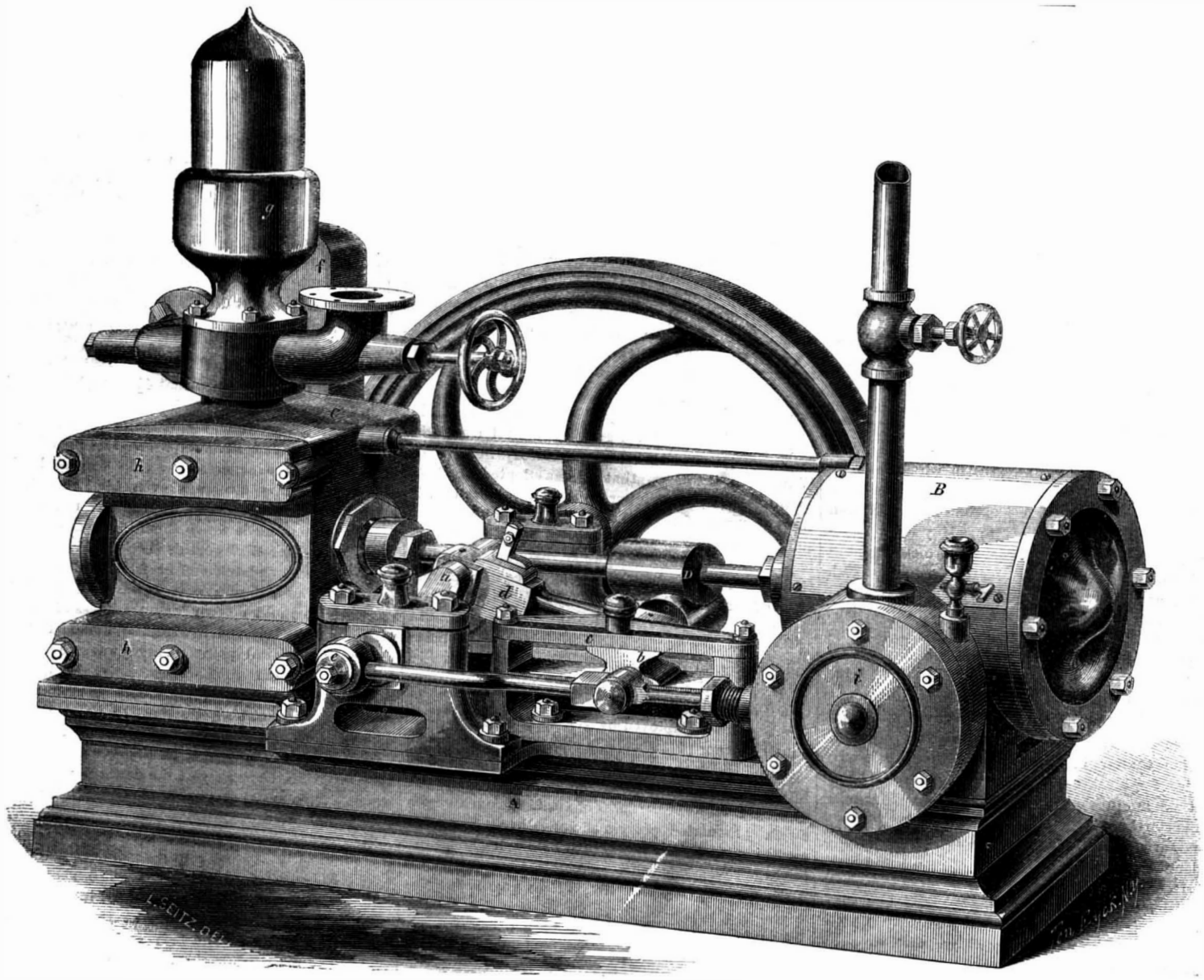

SEWELL'S PATENT STEAM PUMP.

Improved Patent Steam Pump.

A steam pump that is always in working order, and reliable for the purposes for which it is designed, cannot be too highly valued. The safety of passengers, the ship and cargo, depend at times in a great degree upon their unintermittent action. In order, therefore, to be depended upon for these objects, the working parts must be few and strong, and the construction of the pump in its water passages and in the arrangement of its valves, such that it is at all times easily inspected should any derangements occur, as they sometimes will, even when in the charge of the most experienced engineers. Such features, we think, are embraced in the steam pump herewith illustrated, invented by Mr. William Sewell, of New York city. The operation of it and the details may be comprehended by referring to the letters. It consists of the usual cast-iron frame or bed-plate, A, on which are bolted the steam and water cylinders, respectively B and C; between the steam cylinder and pump, two pillow-blocks are bolted on projections of the bed-plate, these blocks carry the crank-shaft, *a*. Upon the piston rod the cross-head, D, is attached, which, while it insures a rectilinear movement to both pistons, by means of the guide-block, *b*, moving in the slides, *c*, also furnishes a journal to which the connecting rod, *d*, is attached, thus driving the crank-shaft, *a*, and through it the eccentric pin, *e*, and the fly-wheel. These details comprise the principal working parts embraced in the perspective view.

Fig. 2 represents a section of the pump through the valve seat; in it *a* is the valve, *b* the seat, and *c* the spring which is attached to the block, *f*, and serves, when rubber valves are used, to make them more elastic and quicker in their action; the flange of the air chamber is bolted into the part marked *e*.

The advantages of this pump will be apparent to a practical person upon inspecting its several parts. The steam valve is so low upon the cylinder that all the water from the condensed steam runs out through the ports, and the danger of breaking the piston or of knocking out the cylinder head is removed. The cast-iron air vessel, *g*, is a good feature, as it is frequently damaged by carelessness when made of copper. The induction pipe enters over the water valves and they are consequently always covered, requiring no priming to start the pump; there is also an air chamber, *f*, on this pipe, which materially aids its operations. The valves are very easily got at, and can be removed in a short space of time; by taking off the bonnet, *d*, the valve can be lifted off its pins, and comes out without removing any nuts but those belonging to the bonnet. The mechanical construction of the pump and the finish of it are excellent. We saw one of them running at Messrs. Cameron, Bros., the builders, and it was perfectly noiseless and thorough in its work. The inventor, Mr. W. Sewell, has labored to produce a pump that should be as perfect in its detail and action as possible, and the object seems to be attained. The materials of the machine are of the first quality throughout, the valve seats are of brass, cast in their places, as also is the lining of the pump cylinder; this has been achieved only through persistent experiments and pecuniary loss, but the result, in security against leakage and detachment, is thought to repay the outlay. We are

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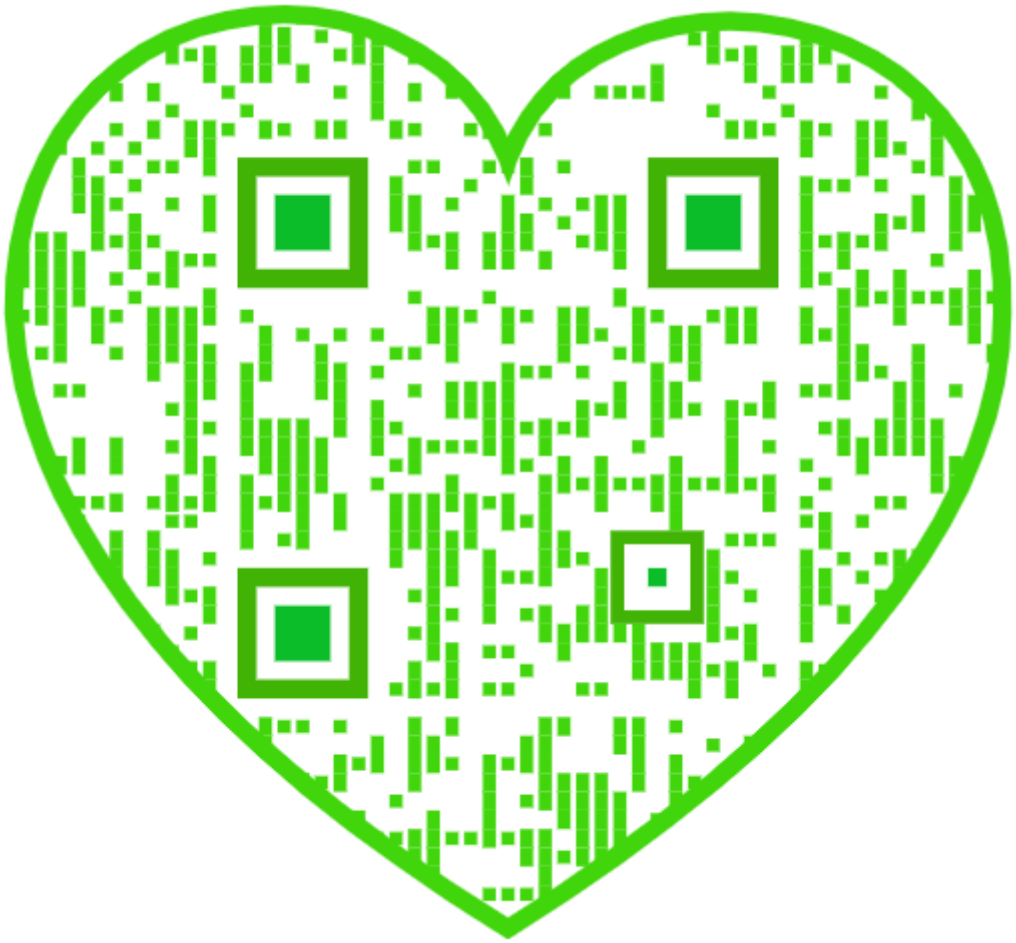
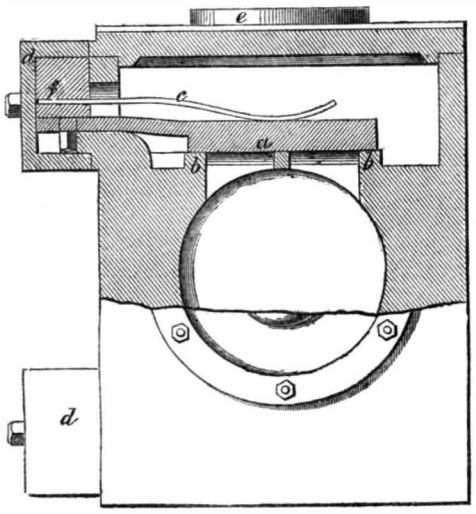


assured that this pump, of which several are now built, has been run 130 revolutions per minute, and that it will force against very high pressure; it is furnished with either metallic or rubber valves, as persons may desire.



The patent for this invention was procured through the Scientific American Patent Agency, Nov. 4, 1862. Further information as regards price, capacity, &c., may be obtained by addressing Mr. William Sewell, Esq., at 64 Cortlandt street, New York.

THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE—PENETRATION OF PROJECTILES.

The following is the substance of an interesting paper read on the above subject, by Mr. Aston, at the late meeting of the British Association for the Advancement of Science, held at Cambridge:—

After alluding to the interest with which the contest between artillery and armor-plates has been watched, he explained what was the actual condition of this important question so late as May last by quoting a statement made by Sir W. Armstrong at a meeting of the United Service Institution on the 20th of May, as follows:—"It certainly may be said that shells are of no avail against iron-plated ships; but, on the other hand, I may say that neither 68-pounder nor 110-pounder guns, with solid round shot, are effective against such iron vessels. The fact is, what we want is a gun, in addition to our 110-pounder guns, with solid round shot, are effective against such iron vessels. The fact is what we want is a gun, in addition to our 110-pounder rifled gun, especially adapted for breaking through iron plates. That is what we are in want of now." This candid confession is startling when it is considered that long ago France armed her *Gloires* and *Normandies* with rifled 90-pounders proved to be efficient against iron plates, and it caused the country serious anxiety to hear Her Majesty's ministers state, as they did in Parliament last session (of course on the authority of their scientific advisers), that, after all the vast expenditures upon our new artillery, the navy of England is compelled to arm her navy with the old smooth-bore, and that is the best gun the navy actually possesses, though declared by Sir W. Armstrong to be so inefficient. Such being the state of the question a few months ago, Mr. Aston proceeded to consider, first, the reason why the artillery hitherto employed in the service (including rifled guns and smooth-bores) has always failed to make any impression on the plated defences at ordinary fighting range, and secondly, by what means artillery science has lately reconquered its lost ground. Three conditions were laid down as necessary to enable artillery to attack successfully armor-plate defences—1st, the projectile must be of the proper form; 2d, of the proper material; and 3d, be propelled from a gun able to give it the necessary velocity. The artillery of the Ordnance committee failed because they utterly neglected the first two conditions, and had recourse to the smooth-bore for the third. The expression accepted as representing the penetrating power of shot was "velocity squared multiplied by weight," but the form of the shot and the material were conditions altogether omitted from the expression, and the importance of the omission will be obvious at once if an analogous case, say a punching machine employed to perforate wrought-iron plates, be taken. What would be the result if the punch which is made of suitable shape and material were removed, and a round-headed poker of brittle cast iron or soft wrought iron were substituted in its place? The great importance of velocity was conceded at once, it is a *sine quâ non* condition, but there has been great misconception in supposing that the old smooth-bore gives a greater initial velocity than the rifled gun, as the results obtained will show. The average initial velocity of the 68-pounder is, in round numbers, 1,600 feet per second, with a charge of powder one-third the weight of the shot, the length of the shot being, of course, one caliber. Sir W. Armstrong stated that, with a charge of powder one quarter the weight of the shot, he obtained with his rifled gun an initial velocity of 1,740 feet per second. He did not state the length of his projectile. Mr. Whitworth, with a projectile two calibers long, obtains an initial velocity of 1,900 feet per second, and with a projectile one caliber long, like that of the smooth-bore, an initial velocity of 2,300 feet per second, being greater than that of the smooth-bore in the proportion of 23 to 16. The following table shows the actual results obtained by various guns:—

Gun.	Range.	Projectile.	Powder Charge.	Penetration into Armor Plate.
Armstrong 110-pounder	200	110-lb. solid	14 lbs.	1½ to 2 inches
68-pounder smooth-bore	200	68 lb. solid	16 lbs.	2¼ to 3 inches
Whitworth 70-pounder	200	70-lb. shot and shell	12 lbs.	Through plate and backing.
Whitworth 120-pounder	600	130-lb. shell	25 lbs.	Through plate and backing.

The first two results show that the Armstrong rifle gun is a worse compromise than the old gun it was intended to supersede. It is worthy of notice that the velocity of the Whitworth heavy projectile, after traversing 600 yards (a good fighting range), was 1,260 feet, being 50 feet greater than the initial velocity of the Armstrong projectile, which is 1,210 feet at the muzzle of the gun. The total results in respect of penetration being so decidedly in favor of Whitworth, it follows that he has adopted the best compromise, by combining all three necessary conditions of proper form and material of projectile and sufficient velocity. That the velocity, though perhaps at the muzzle of the gun slightly below that of the smooth-bore, is sufficient, when combined with proper form and material of projectile, is shown by the penetration result, which in the case of the Whitworth is through and through both armor plate and backing, in the case of the smooth-bore is barely through half the armor plate, and in the Armstrong is not half through. The form of projectiles, both shot and shell, employed by Mr. Whitworth for penetrating armor plates were then described. The material of which the projectile is composed is what is termed homogeneous iron, combining the toughness of copper with the hardness of steel. It undergoes a carefully regulated process of annealing. The same metal is used for the Whitworth field guns, and practical improvements now enable it to be worked in masses of any requisite size, whose quality may be henceforth depended upon with certainty. Mr. Whitworth is therefore now making his heavy ordnance with both interior tubes and outer hoops of homogeneous metal of the improved manufacture, so that the guns will be constructed throughout of one uniform metal, without any welding at all. Experience justifies the expectation that they will be free from the objections which it is well known are inherent in all welded guns, and be fully able to resist the severe and searching strain that is sure sooner or later to disable a gun built up of forged coiled tubes if it be called upon to do its full work by discharging heavy projectiles at efficient velocities.

In the discussion which followed the reading of the above paper Mr. Nasmyth, F.R.A.S., said the steam ram was an old subject with him. A plan was proposed by him to the Admiralty so long ago as 1845. He thought the more destructive you can make the attack on your adversary, the better. It was not right to be torturing your enemy by drilling numerous small holes in him; it was like taking a whole day to draw a tooth. His idea was to make one large hole and sink the ship at once with the enemy. It was a question of *momentum*. The first practical ram was the *Merrimac*, but the Southerners made a mistake in giving her a sharp end—it should be blunt, and such was the original plan of the author, nor had he seen any reason to alter his views. The vessel must present as low an angle as possible to turn shot, but she must also have strength in the direction of her length, and use the utmost possible amount of steam; and to meet the objection that the impact might destroy the engines, which he did anticipate, he would place the engines on a slide, with buffer arrangements. With such a vessel he would dash into the *Warrior* as into a bandbox. The plates would be crushed at once. He hoped the Admiralty would devote a thousand pounds or two to try the effect of a ram against an old hulk, the ship *Trusty*, and afterward at the *Warrior* herself.

Admiral Sir E. Belcher observed that in 1818 he had urged a plan of unsinkable ships to Sir Robert Seppings by shutting down the hatches and using the pumps to pump in air, but this was objected to on the ground that it was necessary to have an opening to keep the timbers sound. He advised water tanks as a backing to the sides of ships, believing that such an arrangement would withstand even Mr. Nasmyth's ram.

Mr. G. P. Bidder, Jr., observed that with a smooth-bore the balls go accurately for a short distance, but afterward they diverge in uncertain directions.

Captain Blakeley said that Mr. Aston had told thom that Mr. Whitworth was beginning to use homogeneous metal for the inside and outside of his guns, and he (Captain Blakeley) would encourage him to use this, as he had for several years past used it with great advantage. He had made guns, in use abroad, of large size, which would throw rifle 600 lbs. shot with 80 lbs. of powder. The Spaniards had such guns, and he thought the English Government ought to give some encouragement for trials of every kind of gun as well as rams.

Mr. J. Scott Russell, F.R.S., said that at the last meeting it was ascertained that 4½-inch plates and 18 inches of wood would beat the gun, but late experiments had shown that Sir W. Armstrong fired our wooden ships, and Mr. Whitworth had proved that he could do the same if the ship be plated. No ship of ordinary size was even big enough to carry indestructible plates. Why could not a good fighting ship be made which should keep out a shell? He believed that Whitworth's shell would be stopped by double armor plates, one in front and the other behind it; but a larger one, it was said, would be made which would destroy any thickness of double plates, and he believed it would be done. But this was not the critical point. There was one way of carrying increased thickness—namely, by the increased size of vessel. There was, however, another way without increasing the size—to build the ship up to the water's edge, cover her below the water line as far as was necessary to prevent penetration, then diminish the battery on the deck, and then they would have a vessel somewhat like the *Monitor*, absolutely shot-proof.

Mr. Robinson, observed that such was the arrangement of the Whitworth gun that the friction in the barrel was reduced to a *minimum*. The shot would fall from the barrel with a very small inclination.

Mr. Aston asked what would be the condition of Mr. Scott Russell's ship with shells which would penetrate 30 feet below the water line? and this Dr. Robinson had told them was possible. As to the partially-defended ship, would any captain ask his men, some to stay in the undefended part, while others were comfortably ensconced behind eight inches of armor plate? He (Mr. Aston) considered that guns built up of rings could never stand.

The President (Mr. Fairbairn) said the great difficulty about homogeneous iron was its liability to be of unequal quality. Mr. Whitworth took very great pains in the manufacture, but the great danger in the case of the coils is that they are apt to elongate.

Mr. Kemper, of Ohio, (says in the *American Agriculturist*) that bleeding from a wound on man or beast may be stopped by a mixture of wheat flour and common salt, in equal parts, bound on with a cloth. If the bleeding be profuse, use a large quantity, from one to three pints. It may be left for hours, or even days, if necessary. In this manner he saved the life of a horse which was bleeding from a wounded artery; the flow ceased in five minutes after the application. It was left on three days, when it worked loose, was easily removed and the wound soon healed.

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PATENTS FOR SOLID WATER-PROOF CARTRIDGES.

Having had several inquiries recently respecting the manufacture of solid powder cartridges, especially those of Professor R. O. Doremus and B. Z. Budd, of this city, we have obtained copies of their patents, and will present a condensed and clear abstract of their contents. The first patent was issued March 18, 1862, and embraced the manufacture of their solid cartridge; the second patent was issued on the 25th of the same month, and simply embraced the rendering of their patented cartridge water-proof by coating it with a substance insoluble in water.

The nature of the invention described in the first patent consists in taking granulated dry powder, and placing a certain quantity to form a charge in a mold of a cylindrical form, then submitting it to pressure under a piston, by which pressure the dry powder becomes solid, and may be removed from the mold and handled freely. Another part of the invention consists in submitting two or more layers of powder in one cartridge to different degrees of pressure, to produce what is called an "accelerating cartridge." The method of manufacturing these cartridges is as follows:—Molds of the requisite size and form are provided with suitable movable pistons to fit into them. To make a cartridge for a six-pounder gun, in which 1¼-pounds of powder constitutes a charge; this amount of granular dry powder is placed in a cylindrical smooth brass mold, of such a diameter as coincides with the bore of the gun, so that the cartridge will enter it. When the powder is introduced, a piston is placed upon it in the mold and pressure by a hydraulic or screw press, is applied until the powder has been condensed by a power equivalent to fifteen tuns weight. The piston is then taken out, and the compressed powder discharged, in the form of a cylindrical cake, and may be handled without breaking. It is stated that in this form the granular condition of the powder still exists. Other sizes of cartridges are formed in a similar manner.

To make an accelerating cartridge, the method described is as follows for three degrees of combustibility:—The powder is divided into three portions; one of these is first placed in the mold and submitted to a pressure of twenty-five tuns; the second portion is then poured in and subjected to a pressure of twenty tuns, and finally to the last portion there is applied a pressure of fifteen tuns. The whole of the powder placed in the mold and thus treated is now compacted into one mass or cake, having three distinct strata of different degrees of combustibility. That which has received the greatest amount of pressure consumes less rapidly than the other portions. The rapidity of ignition and burning of each is in proportion to the degree of pressure to which it has been subjected. The requisite pressure for such cartridges can only be ascertained by experiment.

It is stated that the powder in cartridges made in this manner by solidifying will resist the action of moisture for a longer period than when in loose grains. It will be understood that these cartridges are cylindrical cakes of powder without paper or any other usual covering. As the charges for artillery are usually contained loose in flannel bags, the latter are stated to be the chief causes of fouling the gun, thus necessitating such frequent sponging; therefore, the use of the uncovered solid cartridge is set forth as a great advantage.

Two claims are embraced in this patent; the first is for forming solid cartridges of dry granulated gunpowder by compressing it in suitable molds; the second covers the forming of cartridges in strata of different degrees of combustibility.

The patent for rendering such cartridges water-proof states that they may be dipped when delivered from the mold into collodion, or this substance may be applied to their outside with a brush. It is stated that when the cartridge is to be attached to the bullet, it is dipped into the collodion so as to cover the joint between the projectile and the powder. Instead of collodion, other substances may be used, such as shellac varnish or any composition not injurious to the powder, yet impervious to water.

The claim is only for the rendering of the specific artridges described water-proof, for solid water-roof cartridges had been previously made and patented. Two patents issued for solid cartridges were described on page 266, Vol. VI. (new series) Scientific American. We will state their nature succinctly again, and thus present a full abstract here of all the patents which have been granted for compressed cartridges.

The first patent was issued to J. H. Brown, of England, dated October 15, 1859—American patent dated August 20, 1861. The patentee claims combining and compressing grains of gunpowder with an adhesive solution, into solid cakes or charges for loading ordnance and fire-arms.

The second patent was granted to Robert Bartholomew, United States Army, May 21, 1861, and embraced compressed cartridges of powder, composed of nitrate of potassa, seventy-five parts; charcoal, twelve; sulphur, ten; chlorate of potassa, three. The charges were incorporated with collodion compressed in molds, then finally coated with collodion. These compressed cartridges are also water-proof, but are compressed moist, while those of Doremus & Budd are compressed dry.

With respect to the use of powder for rifle shooting, J. Chapman in his work on the "American Rifle" says: "I advise all marksmen to put the bullets down lightly, but hard enough to insure their presence upon the powder, and as nearly alike every time as possible; which may be done to a nicety in a properly freed weapon, avoiding the 'ram-jam' system altogether, for it has a tendency to crush up the grains of the powder, and also deprive the charge of its due quantity of atmosphere, which probably has more to do with the proper effect of gunpowder than we are actually aware of. The size of the grains of the powder must be proportioned to the size of the calibre combined with its length. In general, short barrels require quick, consequently small grained, powder; long ones slow, consequently large grained, powder." Such opinions appear to be opposed to the use of compressed powder for rifle-shooting. A series of experiments would determine the question between the use of loose powder in grains and compressed into cartridges; but as far as we have been able to ascertain, no set of experiments of this character have been made.

Naval Construction and Harbor Defense.

We have received a communication from General H. Haupt, who is charged by the War Department with the construction and operation of United States military railroads, in which he presents the following inquiries which are of great practical importance at this time:—

INTERROGATORIES.

What have been your opportunities of acquiring a knowledge of the theory or science of Naval Construction?

Have you constructed any vessels; and if so, what ones?

What were the tunnage, draft and speed of those vessels?

Have you informed yourself as to what foreign nations are doing in naval construction?

Give the names and prominent features of vessels possessing distinctive characteristics in regard to model, speed, draft, consumption of fuel, &c., which have been built by foreign Governments or private capitalists. Whether the information is derived from your own personal knowledge or observation, or from other sources?

Give similar details in regard to vessels built by the United States Government, at the navy yards, under charge of the naval constructors or other United States officers.

Give similar details in regard to vessels built at private ship yards in the United States, by parties not employed by the Government.

If a comparison of these vessels offers any strong contrasts, present those which, in your opinion, are most striking.

What is the cost of work in Government navy yards as compared with the cost in private ship yards?

Have the results obtained in vessels built after the plans of the Bureau of Construction verified the calculations of that bureau in regard to draft, speed, cost, and other particulars?

Have naval constructors been appointed by Government who possessed no practical knowledge of the art?

Is this the case with those who have charge of private ship yards?

Are the plans of the Bureau of Construction often changed during the progress of the work?

Are these changes productive of increased cost or other disadvantages?

Are such changes of plans, during construction, as frequent in private ship yards?

To what cause do you attribute these facts?

Which of the seven gun-boats—*Iroquois*, *Dacotah*, *Wyoming*, *Seminole*, *Pawnee*, *Narragansett* and *Mohican*—have been the most successful in lightness of draft, efficiency, displacement with smallest proportion of power and consumption of coal?

Who built the gun-boats which gave the most satisfactory result?

By whom were the others built?

Have you given any attention to the subject of iron-clad vessels?

What is the power, tunnage, armament, speed and general efficiency for attack and defense, of the largest English and French iron-clads?

How many iron-clad vessels has each of the European nations finished, or in process of construction?

What vessels is it understood that the so-called "Confederate States" are now procuring in Europe?

How do those vessels compare in power, speed and general efficiency with our *Monitors* and other American armor-clad vessels?

What would be the probable result of an encounter?

Have we any present means of protecting New York, Philadelphia, or Boston against an attack by such armor-clad vessels as are now being built in Europe?

What is your opinion of the damage to which we are, or soon will be, exposed from Confederate iron-clads, if means of defense are not promptly adopted?

What means of defense could be applied in the shortest time and with greatest efficiency?

Have you given any attention to the subject of ordnance, in connection with iron armor for ships-of-war?

What is your opinion of the propriety of placing 15-inch cast-iron guns in the turrets of the *Monitors*?

Can such guns be fired with heavy charges of powder?

Can a high velocity be given to a projectile without a heavy charge of powder in proportion to its weight?

Does a large diameter of projectile, with a given velocity, reduce the power of penetration, and in what ratio?

What should be the ratio between the powers of penetration of a projectile fifteen inches in diameter, moving with a given velocity, and a projectile of half the diameter and equal weight, moving with double the velocity?

Is it probable that you could, with equal safety to the gun, impress upon a projectile, from a 7½-inch bore, nearly double the velocity that could be given a projectile from a 15-inch bore?

What, in your opinion, would be the proper armament for vessels-of-war, and for harbor defenses, to be used against armor-clads?

What are the requisites for ships and batteries, to be used in harbor defenses?

What is, in your opinion, the best mode of constructing armor for ships and floating batteries?

Have you given attention to the subject of marine engines?

Are the engines used, and being used, in our navy, the best adapted to the objects to be attained?

Is it possible, with economy of space, as compared with ordinary engines, to condense all, or nearly all, the steam, and use fresh water in the boilers?

Would any advantage result from the use of high-pressure steam; and if so, how?

Could high steam, with a proper construction of boiler, be used as safely as low steam, in ordinary engines; and if so, what advantages would result from its use?

The object which General Haupt has in view is to secure as soon as possible practical information in reply to the above inquiries, with a view to lay the matter before the President. He hopes thereby to secure, for the national welfare, such knowledge as will enable the Government to speedily adopt such plans as will insure us against all danger of a successful attack by our enemies. All communications should be addressed to General H. Haupt, Washington, D. C.

Fighting.

A soldier in the Mexican war thus gives his experience in the line of his professional duties:—"Fighting is very hard work; the man who has passed through a two hours' fight has lived through a great amount of mental labor. At the end of a battle I always found that I had perspired so profusely as to wet through all my clothes. I was as sore as if I had been beaten all over with a club. When the battle commences the feelings undergo a change. Did you ever see your house on fire? If so, it was then you rushed into great danger; it was then you went over places, climbed over walls, lifted heavy loads, which you never could have done in your cooler moments; you then have experienced some of the excitement of a soldier in battle. I always knew my danger—that at any moment I was liable to be killed, yet such was my excitement that I never fully realized it. All men are not alike; some are cool, some are perfectly wild or crazy; others are so prostrated by fear that they are completely unnerved—an awful sinking and relaxation of their energies takes place, awful to behold; they tremble like an aspen, slink into ditches and covert places, cry like children, and are totally insensible to shame—dead to every emotion but the overwhelming fear of instant death. We had a few, and but a few, of such in our army."

A Washing-machine contest lately took place at Oakland, Cal., between the machines *Economy* and *Excelsior*. *Economy*, worked by one man, washed forty-four yards of shirting and wrung them out in five minutes. *Excelsior*, worked by two men, washed forty-four yards and wrung them out in eight minutes.

The Wheeling (Va.) *Intelligencer* states that excellent cotton has been raised in the vicinity of that city by Jacob Singleton. He intends to plant a considerable quantity of cotton seed next season.

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POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting on Thursday evening, Nov. 13th; Mr. Tillman in the chair.

DOOR LOCKS AND EXPLOSIONS.

Mr. CHURCHILL—This is one of Pye's patent door locks; I have had one a year, it has been subjected to pretty rough usage and is a good lock still. It cost a dollar, and the inventor says that it cannot be picked.

Mr. BUTLER—That is offering us a little too much—an unpickable lock for a dollar. [The speaker explained the construction of the lock; saying that it had two tumblers above the bolt and one below, and that the bolt was pressed forward by a spring. He then continued.] All locks of this character when placed upon a door may be opened without picking. It is necessary only to introduce a thin screw-driver or blade between the edge of the door and the jamb and press the bolt back. That can be done by any sneak thief, who has not the skill to be ranked among burglars. I believe that burglars do not recognize those boyish and unskillful thieves as belonging to their fraternity.

Mr. STETSON—I would ask Mr. Butler if the statement on the card is correct? It says this lock cannot be picked.

Mr. BUTLER—I should say that it would take one of Mr. Chubb's apprentices about 15 minutes to pick this lock if he had it on the bench before him, but if he was obliged to operate through a door it might be difficult. [The speaker then explained the process of picking the lock.]

Mr. ROWELL—The idea has frequently occurred to me—why should we place a lock on the door? Why not secure it in the wall of the building and let the bolt catch into the door? Then we might have the lock as massive as we please.

Mr. BUTLER—In Egypt they place the locks on the outside of the doors. The locks are made of wood, and travelers speak of seeing men with bundles of wooden keys on their shoulders.

Mr. FISHER—Would it not be a good measure of security to have the keys so massive that they could not be carried without being seen?

Mr. BUTLER—That would involve the necessity for a large keyhole, by which powder could be introduced and the lock blown off. This is now the principal danger that we have to guard against. The permutation lock is capable of several hundred millions of changes and cannot be picked, but it may be blown off by gunpowder. To prevent this, bank locks are now made with vents or openings for the gas to escape, and this is generally a safeguard against the effects of powder, but I suppose it might not be against gun cotton, as that explodes more quickly than gunpowder.

The PRESIDENT—Will Prof. Seely state whether gun cotton explodes more quickly than powder?

Prof. SEELY—It does not.

Mr. KELLUM—Gun cotton explodes more quickly than gunpowder. It is the difference between explosion and sudden ignition. It is the vacuum that causes the report.

Mr. STETSON—It may be well, as we are on the subject, to consider the difference in the different kinds of explosive compounds. When fulminating mercury is fired it shatters everything in its immediate neighborhood, but it does not seem to follow up the fragments and send them to a distance; while the force of gunpowder is less violent in its close vicinity, but follows the fragments further and consequently throws them to a greater distance.

Prof. SEELY—Mr. President, I answered your question rather briefly, but for a full reply some explanation is required, and it may be of interest to the Society for me to give some description of the explosive properties of gun cotton. I shall make my remarks with considerable confidence, as I have probably made more gun cotton than any other person in America, and have tried more experiments upon it. If a bunch of gun cotton pulled out loosely is laid upon a hot stove, and some gunpowder is laid by the side of it, probably three-quarters of the persons in the room would say that the gun cotton explodes the more quickly. If some gun cotton is pulled out loosely and some powder is sprinkled on it and a match is applied to it, the cotton will burn without setting the powder on fire. This is owing to the fact of its burning with a flame in which the heat is not intense. If some gun cotton is placed loosely in a wide-mouthed vial and is lighted at the top, it will burn pretty quickly at the top, but the combustion will proceed more and more slowly till about three-fourths of the mass is burned, when it will go out. If gun cotton is twisted into a hard string, it will burn but little faster than ordinary cotton. In loading a cannon with it, if it is put in loosely, it will explode like gunpowder, but if it is rammed down hard, with a tight fitting wad on the top of it, it will not explode at all—it will not burn any more than dirt. Several accidental explosions of gun cotton that have occurred within my knowledge prove that although the force is great, it is generated slowly. At the place which I now occupy, 244 Canal street, a very careless operator was drying ten pounds of gun cotton over a hot furnace when it exploded. The man was standing in the same room and within a few feet of the furnace; his hair was singed, but he was not otherwise injured, while the windows of the front room, some 40 feet distant, were blown out. Mr. Janes, who was three stories above, said that he did not hear much noise but he felt himself lifted about 18 inches. Last winter a building was blown up in Fifty-first street, and I examined the premises very carefully the next morning. It was said that there was 300 pounds of gun cotton in the building, and the destruction was certainly not as great as would be produced by 300 pounds of gunpowder. The roof was lifted and the walls were thrown down, but the materials were not thrown any considerable distance. In July last Mr. Dornbach was killed in Williamsburgh by an explosion of gun cotton. He was filling a barrel intended to hold 60 pounds, and had got it nearly filled when it went off. His hands and face were burned, but he was not injured otherwise than by the burning.

Mr. BUTLER—How was the cotton fired?

Prof. SEELY—Gun cotton explodes by percussion, and it was either percussion or friction which set that on fire. The cotton had become very warm in the bright July sun, and then the violence used in driving it into the barrel with a stick set it off, by either percussion or friction. If it had been 60 pounds of gunpowder it would have blown Mr. Dornbach to pieces. This is the article which was made by Schonbein, the discoverer, and is known as "gun cotton." It differs from ordinary cotton in containing more oxygen, but it does not contain enough to burn it. It has been discovered since that by varying the manipulation a little, a larger quantity of oxygen may be introduced. Gunpowder contains sufficient oxygen to effect its complete combustion; it will burn in a close chamber, or under water, but this is not the case with gun cotton, it will not burn unless supplied with oxygen. By adding chlorate of potash or niter, the oxygen is supplied and a compound is produced which explodes with great violence, and it is possible that in this way a practicable substitute for gunpowder may be produced.

STEAM ENGINE GOVERNOR.

Mr. DIBBIN—This is a model of Tremper's steam engine governor. [The speaker proceeded to explain the invention, which could be made intelligible only by means of elaborate engravings.]

DRY GAS METERS.

Mr. JOHNSON—The dry meter on the table I placed there for the inspection of members. In connection with the subject I will state that the first dry meter in America was made at the suggestion of Wm. S. Johnson by James Bogardus in 1832, and there has been in the average a patent a year granted since.

PAPER AND ITS USES.

Mr. FISHER—I would ask if any one present has any definite information in relation to the manufacture of paper from the husks of Indian corn? Many years ago there was a good deal said on the subject but recently it has been revived as something new. In 1852 a book was published by the Smithsonian Institute, which contained varieties of paper made from some 30 different materials, and I believe one has been published in England which contained paper from over a hundred materials.

The PRESIDENT—I have here a communication to the Society from a correspondent in Ohio accompanying a sample of grape leaves, which the writer says are principally fiber, and he thinks they may be used for paper. Will the Secretary pass the leaves around for examination.

Mr. FISHER—I should think the fiber was too weak. [This remark was just; there was no strength in the fiber.—*Reporter.*]

The PRESIDENT—Here is another communication on the subject of American Jute; will the Secretary please to read it.

Mr. FISHER—I should think it was hardly worth while to read it; I see it is very long.

The PRESIDENT—If the reading is objected to, it must be omitted.

The SECRETARY—The communication is interesting, and with the consent of the Society I will briefly state its substance. The writer points out that the plant known as American Jute is not allied botanically to the Indian Jute, and he then shows that it may be cultivated in this country, probably with profit as a material for paper-making.

Prof. SEELY—I recently had occasion to examine some very old books, and was impressed with the difference between the paper of which they were made and the paper that is manufactured at the present day. In tearing that old paper a very rough edge was formed by the long fibers of the material; but if a piece of modern paper is torn, the edge formed is very smooth, showing a very short fiber. This is owing to the use of the material so many times. It is collected and worked over and over until the fibers are broken into short pieces. These broken fibers will not answer for filtering paper, for paper made of them, if placed in water, would be converted into pulp. The filtering paper used in chemical analyses is all made in Sweden. It is retailed in this market at twelve cents a sheet. Photographic paper was, at one time, all made in England; then in France; but now Saxony makes the best and principally supplies the markets of the world. It must be made of perfectly uniform materials. If some competent American manufacturer would embark in the business, he might monopolize the market in this country, and would probably find a large export demand.

Mr. STETSON—Can any one tell what was the result of Mr. Lyman's experiments?

Prof. SEELY—I understand that he is very sanguine of success. He places straw in superheated water—that is, water under pressure—and he claims that the silex is all dissolved.

Mr. CHURCHILL—It is claimed that by introducing alkali he has a superior sizing.

Mr. ROWELL—In regard to Mr. Lyman's first process—that of blowing the material from a steam gun—I had a long talk with a large paper manufacturer who has kept close watch of the experiments, and he said that the only difficulty was the expense. They could not separate the fibers cheaply enough. They had strong hopes that rattan might be worked by the process so as to pay, and were making arrangements to test the matter thoroughly by erecting an establishment on the edge of a cane-brake at the South, when the rebellion broke out and the enterprise was of course abandoned. The advantage of canes is that the cylinder could be nearly filled with them, and thus but little steam would be wasted.

Mr. MINTHORN—If kelp could be used in making paper very large quantities might be obtained at small expense.

Mr. STETSON—I have seen seaweed thrown in upon the shore and lying in a pile several miles in length and at least two feet in depth. The difficulty is in keeping it from one interval to another of its coming to shore.

Mr. FISHER—Why cannot flax be prepared by Lyman's steam-gun process?

Mr. ROWELL—Every kind of vegetable fiber was tried, but the insurmountable obstacle was the expense.

Mr. STETSON—Can any one tell us exactly what was the "papyrus," and whether it has been used in modern times?

Dr. STEVENS—The papyrus was a lily which grew in the Nile. Attempts have been made to cultivate it in England but without success.

The subject of "Iron-plated Ships" was selected for the next week, and the Association adjourned.

BARTLETT pears, weighing 22 ounces each, are not uncommon in the gardens of San Francisco.

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THE GREAT MISSISSIPPI SCHEME.

The personal character and career of one man are so intimately connected with the great scheme of the years 1719 and 1720, that a history of the Mississippi madness can have no better introduction than the life of its great author, John Law. Opinions are divided as to whether he was a knave or a madman; these epithets were, at all events, unsparingly applied to him, both during his life and after it. Later generations, however, have concluded that he was more sinned against than sinning. He understood perfectly the whole system of credit, and if he failed it was not so much his fault as that of the people among whom he had erected it. This extraordinary man was born at Edinburgh in the year 1671; his father was a goldsmith and banker, and amassed great wealth. At the age of fourteen John was received into his father's counting-house, for which profession he had always manifested a great predilection. In person he was strong and well made, and his face, though deeply marked with the smallpox, was full of intelligence. At seventeen years of age he was vain, fond of dress, and a great favorite with ladies; and at the death of his father, which took place soon after, he became possessed of his patrimony and proceeded to London to see the world. Here those pitfalls of youth—riches, good looks and idle hours—ensnared him and he became a gambler; but, by pursuing certain abstruse systems of calculation, he won considerable money. His success with the softer sex was equally encouraging to him, and for a time fortune only smiled upon him. These successes, however, only paved the way for reverses; continued success made him imprudent, he became an irrecoverable gambler and at last was obliged to mortgage his family estate. As misfortunes never come singly his gallantry also brought him into trouble; he fought a duel with one Wilson, who had challenged him, and shot his antagonist dead on the spot; he was arrested, tried, and sentenced to death, but this was afterward changed to a fine, upon the plea that the offence was only a manslaughter and not murder. He contrived to escape from the King's Bench where he was confined (exception having been taken to the last verdict) by some means which were never ascertained; whereupon rewards were offered for his apprehension, which were of no avail; he was never caught, nor was he ever again tried for the offense.

Law, after the escapade above related, reached the Continent, where he traveled many years, giving much attention to the banking system of the countries he passed through. It is supposed that he returned to Scotland in the year 1700, where he published certain pamphlets, one of which—a project for establishing a land bank (called by contemporaneous wags a *sand* bank), the notes issued by which were never to exceed in value the entire lands of the State, or were to be of equal value to the same—excited a great deal of discussion in the Scottish Parliament; that body, however, ultimately decided against it. When this and his efforts to procure pardon for the murder of Wilson failed, he again withdrew to the Continent and took to gaming. For fourteen years he roamed over various countries—Flanders, Holland, Italy, Hungary and France—becoming intimately acquainted with the resources of all of them, and more and more convinced that no country could exist without a paper currency. During all these years of vagabondage he supported himself by play, and was expelled from various continental cities as a person too dangerous for the tender youth of those moral towns to come in contact with. In Paris he was especially obnoxious, and was ordered by the police to quit the capital; he did so, but not until he had made the acquaintance of several dukes, among others the Duc d' Orleans, who afterward exercised so much influence over his fate; the latter functionary was pleased with the good sense (?) of Law, who lost no opportunity to instil his peculiar financial doctrines into the duke's head.

Some time during 1715, Law proposed an illusory scheme to Desmarets, a French banker, who refused to have anything to do with it. He then returned to Italy, and proposed to Victor Amadeus to establish a land bank in that country, but the wily monarch replied that his kingdom was far too circumscribed for such grand operations, and that he was much too poor to be ruined; he ended by advising Law to try the king of France once more, saying that the people would be delighted with a plan so new and plausible. Acting upon this advice Law soon after returned to Paris. Shortly after Louis XIV died, and the heir to the throne being an infant, only seven years of age, the Duc d' Orleans assumed the government, and Law now found himself at the top of that tide which, taken at the flood, leads on to fortune. Upon the death of the old king the most extraordinary state of affairs existed. The finances of the country were in a most disordered condition; the corrupt monarch, whose example had been imitated by almost every official in France, had brought the country to the verge of ruin. The national debt, the revenue, and the expenses of the Government, amounted to 3,000,000,000 livres; to pay the interest upon this sum there remained a balance of but 3,000,000 livres in the treasury. To remedy this evil a council was summoned, and the Duke St. Simon was of opinion that nothing could save the country but to declare a national bankruptcy. This desperate remedy was, however, opposed, and fell to the ground by its own weight. The measures ultimately adopted, although they promised fair, only aggravated the evil. A recoinage was ordered, which depreciated the currency one-fifth; those who took a thousand pieces of gold or silver to the mint, received an amount of coin equal in nominal value to their treasure, but of only four-fifths of the weight of metal; by this piece of ingenuity the treasury gained 72,000,000 livres, but all the financial and commercial relations of the country were disordered. In order to curry favor with the populace after this last stroke of business, all the State contractors, and farmers of the revenue or tax gatherers, were ordered to account for their mal-practices; a fifth part of all the fines imposed upon those gentry being promised to informers against them. The promulgation of this order caused, as it well might, the utmost consternation among them, and the jails were soon filled to overflowing with these ancient "shoddy" operators; out of the whole number but one was executed, that one was Samuel Bernard. This man offered £250,000 sterling, English money, to be allowed to escape, but without avail, as the law was carried out to its full extent. The severity of the Government fell upon all, but so corrupt was every branch of the Administration that little or no benefit resulted to the country; the people could not see the justice of taking from one set of robbers to enrich another class; the voice of complaint resounded from every side, and the last order was repealed.

In the midst of this financial confusion Law appeared upon the scene; he sought an audience with the Regent, and put forth such specious reasons for the adoption of his peculiar banking schemes that they were soon adopted. On the 5th of May, 1716, an edict was issued, by which Law was authorized to establish a bank, under the name of Law & Co., the notes of which were made payable for taxes. The capital was fixed at six millions of livres, in twelve thousand shares of five hundred livres each, purchasable one-fourth in specie and the remainder in billets d'etat (bills of state.) Our adventurer was now upon the road to fortune; he made all his bills payable at sight, and in the coin current at the time they were issued. This last was a master-stroke of policy, and rendered his notes more valuable than the precious metals, which were constantly being depreciated by the Government. In the course of a year, through Law's plans, his notes were at a premium of 15 per cent, while the billets d' etats, issued by Government as security for the debts of the late king, were at a discount of no less than 78½ per cent; the comparison was too great in favor of Law not to attract attention, and he rose in consequence of it. The Regent, astonished at his success, conceived the idea that paper, which had so aided the specie currency, would entirely supersede it; and Law, taking advantage of his delusion, now proposed to him that they should establish a company which should have the exclusive privilege of trading to the Mississippi. The country was supposed to be rich in precious metal, and the company intended to be the farmers of the revenue and carriers of the money they might accumulate. The company was incorporated in 1717, the shares payable in billets d'etat, at their nominal value, although worth no more than 160 livres in the market. After much financiering, which had all along been determined upon, but was only delayed as a means of deceiving the people, the company finally became the "Royal Bank of France;" as soon as this occurred the Regent caused an issue of notes to be made amounting to one thousand millions of livres. This, to do Law justice, was strongly opposed by him, but without effect; in this irresponsible way matters continued. He found that he lived under a despotic Government, and whether he cared for consequences or not, at all events he lent his aid in flooding the country with paper money, which, having no solid basis, was perfectly worthless, and blindly shut his eyes to the future. The Parliament was envious of Law on account of his foreign birth, and when a change took place in the Ministry of the Finance, as it shortly did, they became particularly hostile. The first financial feat of the new minister, D'Argençon, was to order that all persons who brought 4,000 livres in specie and 1,000 livres in billets d'etat, should receive coin to the full amount of his notes and gold. He plumed himself mightily upon this master-stroke as creating 5,000 new and smaller livres out of the 4,000 larger ones—being so ignorant of the true principles of trade and commerce that he did not know the immense injury he was doing to both. To this little piece of ingenuity the Parliament entered a decided protest by issuing a counter order, that no money should be received but that of the old standard. This was, in its turn, supplanted by an order from the Regent, which was also met with renewed opposition, until affairs attained such a pitch, with the conflicting acts of the two authorities, that it finally culminated in Law's bank being forbidden to have anything to do with the administration of the revenue; some of the senators even proposing to hang the afore-mentioned person at sight. At this Law, in great alarm, fled to his old-time friend the Regent, who at last allayed the wrath of that high-toned body, the Parliament, by arresting the President and the greater part of the members.

Thus the first cloud upon Law's prospects blew over; he was able to devote all his genius to his Mississippi scheme, which still continued to thrive. The business of the Mississippi Company now embraced the exclusive privilege of trading to the East Indies, the South Seas and China, and to all the possessions of the French East India Company. In consequence of all these magnificent titles the issue of 50,000 new shares immediately suggested itself to Law as a good thing under the circumstances. He promised a yearly dividend of two hundred livres upon each share of five hundred, which, as the shares were paid in billets d'etat at their nominal value—actually worth, however, but 100 livres, made the annual profit about 120 per cent on the investment. It may be readily imagined that the mercurial French did not very long resist these flattering baits; at least 300,000 applications were made for the 50,000 new shares, and Law's house was beset from morning till night.

Such scenes as then transpired, from the popular rage for this worthless paper stock, can scarcely be conceived—dukes, marquises, and duchesses jostled with coal men, porters, and the rag-tag of the population, for an opportunity to secure these precious notes. The most extraordinary stratagems were resorted to, in order to obtain an audience with our little financier; one dame in her anxiety, finding all her other schemes of no avail, at last contrived to overset her carriage, just as Law was at hand, and forthwith persuaded herself that she was terribly injured. Law, who had seen the accident, of course immediately helped the lady into his house, where she soon confessed her ruse. "Monsieur" immediately transferred to her a quantity of India stock. No class nor any condition of life was exempt from this fatal mania—philosophers, jurists, soldiers, eminent men of all classes, high and low, eagerly made their fortunes for a day. The most ludicrous scenes took place among the cooks and chambermaids, who while they revelled in luxury acquired by the rise of their paper, yet retained the manner and language of their former situations. Royal troops from time to time cleared the streets of the people, and an escort preceded Law when he rode out and kept the road uncontaminated for the passage of this august Scot. The price of shares sometimes rose ten or twenty per cent in a few hours. An artificial stimulus was thus given to trade and to remuneration for labor, and for a time everything seemed to pros-

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per; and it is related that one great speculator, being taken ill, sent his servant to sell 250 shares at 8,000 livres, the price at which they were then quoted. The servant went and found in the interval that their price had risen to 10,000 livres, whereupon he immediately sold out and pocketed the difference, amounting to 500,000 livres, and, leaving the rest to his master that evening, set out for another country.

At last the evil day came when all these splendid visions were to fail—when the glittering fabric built of nothing and based upon nothing was to totter and fall with a crash that involved thousands with it. Through a long series of financial gymnastics which we have no space to elucidate, the bank was compelled to stop specie payment. Various schemes were resorted to, in order to raise once more the popular faith in the Great Mississippi Trading Company; but alas, the people having once begun to doubt, were no longer to be gulled. The desperate expedient was even put in force, of going about the streets and gathering up all the ragged and ruffianly, and, clothing and arming these galliards or rowdies with shovels, march them through the streets under pretense of shipping them to the gold mines of Louisiana; this, however, soon ceased to pay, as the people no longer put faith in any measure whatever. A council of state was held on the beginning of May, and the result of it was, after many proposals, that the notes were depreciated to half their value. This raised such a tumult in the land, that this last order was rescinded and their former value restored. Law and D'Argençon were both dismissed from the ministry; such was the popular fury against the former, that he was sought for in vain by the mob, far and near, and a person had only to cry out "Here is Law! here is Law!" and the unfortunate person so pointed out was lucky if he had breath enough left in him to get away. While these scenes were transpiring, Law took good care to keep in doors, and never ventured from the apartments of the Regent where he had taken refuge. At last the final blow to the Great Mississippi scheme, which had of late, led a lingering existence, was administered; a royal edict was issued, depriving the notes issued by the company of all legal value whatever, and the management of everything appertaining to it, taken from the directors; so that the whole affair was virtually reduced to a private company. This was its death-blow, Law had no longer any influence in the chamber of Finance, and the concern despoiled of its privileges could hold out no hope of fulfilling its engagements. Law himself, in despair, determined to leave a country where his life was no longer secure, and soon after set out for Brussels; before his departure, however, he is said to have told the Regent that he was sensible of having committed many faults, but that it was through the weakness of human judgment, not through intentional dishonesty, to which death-bed repentance the reader will attach whatever significance he chooses. Law himself, however, was so certain of the success of his plans, that he had invested all his fortune in real estate, which of course prevented him from realizing anything; after all the untold millions that had passed through his hands, his sole possessions, with the exception of a diamond worth $30,000, were invested in French soil. After many years of wandering about the world, he returned to his former habits of vagabondage. This extraordinary man at last died in Venice, in 1729. Thus ended the career of one of the most extraordinary manias of the past century. It was long before France recovered from the shock; thousands on thousands were utterly ruined by the loss of specie which had been conveyed out of the country by unscrupulous jobbers.

Time is Money—Recollect That!

Anything which will give you a hint as to doing your work better or accomplishing your ends in quicker time or with less labor is equivalent to hard cash. We venture to say that there is not an honest trade or occupation known among the sons of men in which its followers would not be benefited and enabled to save much time by faithfully studying the Scientific American. Farmers, mechanics, manufacturers, men of science and genius, see to it that the Scientific American is ever upon your table; let it be your intellectual whetstone.

Correspondence

The Newspaper Crisis—A Welcome Letter.

Messrs. Editors:—To-day I read an article in the Scientific American on the crisis in the history of newspaper publishing, and desire to say that for one who has received your paper regularly since the fall of 1846, I will cheerfully pay any additional increase in the yearly subscription which the unfavorable state of the times may require. I have been paying three dollars per annum for two other journals, and both of them together are not regarded by me as of so much value as the Scientific American. Mechanics cannot dispense with your paper and keep pace with what is going on in the mechanical and scientific world. During the time I have taken the Scientific American I have been saved a good deal of money in the purchase of scientific books, as in its well-stored columns I have found treatises upon all the various branches of mechanical science, in its most practical and condensed forms. Wishing you continued prosperity, I remain, &c.,

S. L. Denney.

Christiana, Pa., Nov. 18, 1862.

[The above friendly letter we very highly prize. It is but one of many which we have received on the subject of the newspaper crisis. We trust all our readers will thus respond.—Eds.]

The Winans' Cigar Steamer.

Messrs. Editors:—In answer to your inquiry a few weeks ago concerning the Winans' Cigar Steamer. I would state that she is at the wharf of Messrs. Winans at the ferry-bar in this city, as harmless as a dove, without any intent of running the blockade as some of our wise folks here said she intended to do, to act as a ram for the Confederates; but as far as I can learn she was built for nothing but an experiment, as the Messrs. Winans are now building one in London, the same plan of hull, 700 feet long, with screw propellers, one fore and aft, instead of the wheel surrounding the hull amidship as in the present one. The larger vessel was to be built here, but our national troubles put a stop to it. There is also a water tank here, the same shape as the steamer, which was intended to bring salt water from sea to be used in experimenting, as there was an engine and boiler put up on the wharf for the purpose; but unfortunately for science, on her first trip, the tank was captured by the Government officers at Fortress Monroe; but through the intervention of General Dix it was released. Under these circumstances the Messrs. Winans thought it better to spend their money in a foreign land. Observer.

Baltimore, Md., Nov. 17, 1862.

The Sale of English Patents.

Messrs. Editors:—May I be permitted to address a few lines to your extensive circle of patrons? Some few weeks since you very kindly and favorably called attention to an advertisement which appeared in your columns referring to my intention of establishing an agency for negotiating the sale of patents in Europe. That notice brought me letters from all parts of the Union, and in many instances erroneous conclusions had been drawn. It is not my intention to buy patents or even to undertake to record them; but, simply, after they have been recorded, to give personal attention to the sale of them. I hope in a few days to have all my plans perfected, when I will forward an advertisement for publication. To show the extent of your circulation, I received replies from no less than 16 States, and in some cases from the most remote parts. T. Rawlings.

New York, Nov. 12, 1862.

[The Scientific American is undoubtedly one of the very best advertising mediums in the country. It circulates in all the States, is widely read and furnishes a large amount of matter for the use of other journals, as the abundant extracts from its columns will testify.—Eds.

Steam Boilers.

Messrs. Editors:—In our oil factory we have two steam boilers, 30 feet in length and 36 inches in diameter, with 12-inch return flues in each; they do not furnish steam enough for our work. We were told that by putting fire-fronts on them, their power could be doubled; is this so? We have ascertained that it would cost $1,000 to have fronts put on. Would it not be cheaper to purchase another boiler to work with these, than to have fronts put on them?

W. A. W.

Greenport, L. I., Nov. 12, 1862.

[The term you use, "fire-fronts," is not correct; and we do not know what you mean, unless it is a water furnace, that is, the fire enclosed by water tanks on all sides as far as the bridge wall, and connected by suitable pipes to the steam chamber in the boiler itself. If we understand this to be what you propose building, we should advise the use of another boiler, as the increased duty you will receive from the water furnace will be very small—nothing like what you have been told. You cannot expect to double the evaporating power of any boiler unless you increase the fire surfaces in a relative ratio; there is only one water furnace in operation in this country that we know of. The price of constructing those mentioned by you is exorbitant. You will find it more economical to work another boiler.—Eds.

Artificial Ice Machines.

Messrs. Editors:—For the benefit of your Panama correspondent, who inquires for an ice machine, permit me to say that there were two such, one English and one French, in successful operation at the International Exhibition Building, London, England. In the English machine the purpose was effected by means of evaporation, the ice being formed in sheets of say 1 or 1½-inch thickness. The French machine, which seemed to have some advantages over the other, claimed to effect the "economical production of cold by the direct use of heat." The ice is formed in solid cylinders of 5 or 6 inches in diameter, and about 30 inches in length. The prices of the last, range from $20 for the smallest "Household Apparatus," to $2,400 for one capable of producing 220 lbs. of ice per hour; still larger ones are also advertised.

The French manufacturers' address is Carré & Co., 149 Rue Méuilmontant, Paris, France. The address of the English manufacturers I have not by me.

S. L. P.

New York, Nov. 13, 1862.

Petroleum as a Lubricator.

Messrs. Editors:—After using lard oil for several years as a lubricator for our mill machinery, we have abandoned its use for coal or rock oil, which we find to answer full as well, and at but one-third of the expense. It seems to wear as well, and does not gum up like lard oil. For large journals and saw-slides, I use a composition of tallow and coal oil, varying the proportions to suit the season. I know nothing superior to this composition for wagons and buggies; it is similar to a wagon grease sold in market, and it will wear better than anything I have yet found. J. M. G.

Bethel, Ohio, Nov. 10, 1862.

Experiments with a New Gun.

A Washington correspondent says:—"An interesting experimental practice with the monster 15-inch gun took place at the navy yard on Saturday last, in the presence of Secretary Welles, Assistant Secretary Fox, Commodore Harwood and Captain Dahlgren. The gun was loaded with an immense hollow shot, and fired at a target set at right angles about three hundred yards distant. The target is built in the same manner as a ship's side with nine-inch solid timbers, sheathed with 1½-inch plank inside and out, making 18 inches of solid white oak, which is covered with 10 inches of iron plating, covering fifteen feet square. The shell, striking this formidable target, broke into innumerable fragments, some of them rebounding to the battery from which the ponderous gun was fired."

Water is now introduced into San Francisco from an aqueduct extending to Lake Honda, a distance of thirty-two miles. Through this flume, which is sixteen by thirty inches in its dimensions, water flows at the rate of three millions of gallons per day.

A firm in Philadelphia are making 60,000 waterproof blankets, in the form of Spanish cloaks, for the Pennsylvania troops.

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CALIFORNIA INDUSTRIAL ITEMS.

California Wool.—At the second annual meeting of the California Wool Growers' Association, held in San Francisco on the 2d of October, the secretary read a report which contains some information respecting the raising of wool in the Golden State. In 1861 the clip of California wool was 4,544,000 lbs.; this year it will not be proportionally so high. This is due to a series of severe storms during last winter, by which a great number of sheep and lambs were lost. Entire flocks were swept away in some places by the great floods in the rivers. The receipts of wool at San Francisco, since January 1st, were 4,593,640 lbs.; of which 3,938,375 lbs. were exported. The total product of wool for 1862 is estimated at 5,119,640 lbs. The average annual increase of wool for five years past has been forty-six per cent; by this ratio of increase, the clip this year would have been 6,440,000 lbs. The finest wool produced was from a flock of imported Australian merinos.

At the San Joaquin Valley Fair held in September, the president in his address said:—

"We have 1,200,000 sheep, which will average, annually, a fleece of 3½ pounds. This would place the gross production of this article at 4,200,000 lbs., which, at the lowest price (13 cents) paid for wool in large quantities, would reach the handsome figure of $546,000; at 32 cents a pound the figure would be $1,344,000. Take half the difference and we have $945,000. I think it not unsafe to set down the amount realized from the sale of wool at a million of dollars, and if that single branch of our rural economy yields us that amount now, what, I ask, may we calculate upon as being in store for us in years to come? In comparison with our resources and facilities for wool-growing, that branch of industry is still in its infancy."

The Bee Business in California.—The Stockton *Republican* states that this has been a very successful year for California bee-raisers. It says that H. K. Clifford, who has 75 stands on the San Joaquin, asserts that during June last one hive made, in Stockton, 30 pounds of honey; other hives far exceeded this figure. Mr. Clifford has sold about 200 stands, this season, at $9 each. (Langstroth's make.) He retails the honey at 15 @ 20 cents per pound. The best bee pasturage is on the San Joaquin; in fact, that is the only place in the county where bees will do well after the 1st of July, although a great many people are in the business on the Stanislaus and Mokelumne. Those who had bees on the plains were compelled to move them to the rivers, by midsummer, to feed on the honey dew. On the Stanislaus and San Joaquin, up and down, for a distance of 40 miles, the timbered bottoms are full of bees. Major Burney has 75 or 100 hives, and every ranch down to the mouth of the old river, has from 10 to 100 hives, all thriving well. Many swarms fly off to the coast range and Sierra Nevada mountains. At Vallecita, Mr. Isbel found several trees; one man, near Angels, found ten bee-trees this season; Mr. Alley found a bee-tree on Bear Mountain, from which he saved ten gallons of honey. Among the most successful bee-growers, this year, are Combs & Houche, who have the largest lot of hives; D. K. Woodbridge, Hiram Hamilton, T. Paige, H. K. Clifford, John Petty, Mr. Fiske, Andrew Wolfe, C. L. Benedict, Humphrey & Yaple, W. L. Overhiser, and numerous others have given the business much attention.

In getting the data for this article, we consulted a majority of the above parties, and they all agree as to the facts above stated, and as they represent about 2,000 hives of bees, their experience and opinions should have weight. They nearly all use the Langstroth hive—many of them making their own hives, and some procuring them of Mr. Brown, whose shop adjoins the Mechanics' Mills, Stockton. Over 40,000 feet of lumber have been cut up for hives this summer by Mr. Brown's workmen. Each hive takes about 13 feet of lumber, which would make over 3,074 hives. Thus our readers may judge of the extent and increase of the bee trade.

Wines of California.—The Commissioner for California estimates that in 1860 there were six millions of vines in the State, of which nearly one-third were in Los Angelos county; and he believes that the product of these vines in 1862 will reach five millions of gallons. How many varieties of grapes suitable for wine-making are now grown we are not able to say, but already we have a dozen kinds of white wine, each bearing some resemblance to well-known European vintages, but still having a character and flavor of its own. The "White Wine" (for which no one has yet invented a name) might have been grown upon the Rhine, and, if the bottle were decked with the picture of some crumbling old castle, might pass for the genuine Teutonic article. Grapes are raised in some sections which are equal to the best of Portugal, and they will soon supersede the foreign article.

Oregonian Pitch.—A correspondent says that the firs of Oregon contain a gum or pitch equal to the Georgia and North Carolina pines. "Do I say equal—not only equal, but threefold as valuable—and Oregonians should study the fact that vast forests exist here, and hereafter there will be a market, if one of export can only once be started on this coast. Why cannot Oregon supply Chili, California, Sandwich Islands, and other places on or in the Pacific, with tar, pitch, rosin or turpentine?"—*Oregon Farmer*.

American Wine.

As the increased number of vineyards and the manufacture of native wines are becoming important items in the agricultural and commercial resources of our country, we think all the treatises which throw any light upon the character of the grapes which are most suitable for the geographical lines most favorable to the growth of the same will be both interesting and valuable. We append accordingly, the report of the Fruit-grower's Society of Eastern Pennsylvania, as made by Dr. J. S. Houghton, which we quote from the "Gardener's Monthly:"

No grape is suitable for making wine which will not produce, in the process of fermentation, sufficient grape sugar and alcohol to form a wine that will form a wine that will keep for several years in casks or bottles, without the addition of cane sugar and alcohol or spirits obtained from other sources. Domestic wine as commonly made, with the addition of two or three pounds of cane sugar to the gallon of grape juice, and three to six gallons of pure spirits or high wines to the barrel, is not a true wine; its use is injurious to the stomach, and the manufacture of such cordials and alcoholic mixtures should be discountenanced as unworthy of a grape-growing country.

The first essential condition required in grapes to make good wine, is that they should arrive at perfect maturity; that is to say, to such a state of perfection that they will not grow sweeter in a sensible degree. It follows, therefore, that no variety of grape which does not attain this perfect degree of maturity every year, in any given locality, can be depended upon to make wine, however high its wine-making qualities may be in other respects.

The leading wine grape of the Atlantic portion of the United States, at the present time, is the Catawba. This grape does not ripen with sufficient certainty and perfection to make wine in any locality north-east of Maryland or north-west of Central Ohio, oftener than once in five years, except, perhaps, at Kelly's Island, near Sandusky City, Ohio. We have not yet discovered or produced any other grapes than the Catawba and Clinton which can be properly used for making wine. The Clinton is said to make fair wine; the Oporto grape furnishes a port of doubtful quality; the Delaware juice forms a very agreeable wine, and is thought by some to possess the qualities of a true wine grape, but it is not relied upon by the wine-makers of Ohio as a profitable grape for this purpose. The Isabella grape does not come up to the standard of a wine grape in several respects.

The only wines for general use that can probably be made in this country at present are still, sour, hock wines, similar to the sour German and Hungarian wines, having barely sufficient grape sugar to keep them from becoming offensively sour, and a low per-centage of alcohol. We have yet no grapes in general cultivation, capable of making wines having the rich, saccharine, alcoholic and highly-flavored character peculiar to the fine wines of France, Spain and Madeira. Nor is it necessary to success in the making and using of wine as a common beverage by the people, instead of fiery and poisonous alcoholic liquors or badly made beer, that we should be able to make fine, rich wines. The light, cheap wines used by the people of France and Germany with such freedom and good effects as a daily drink, and at almost every meal, are almost identical in quality with the still Catawba made at Cincinnati and at Hermann, Missouri. This kind of wine is, in no respect, very injurious to the habitual drinker. It is slightly nutritious, assists in maintaining the natural heat of the body, quenches the thirst, promotes the digestion and assimilation of food, and, after one has become accustomed to it, is an agreeable and altogether refreshing and useful substitute for some other drinks in common use. It is not so irritating to the stomach as cider; it does not create acidity like the sweetened cordials called domestic wine; it is not so bloating and stupefying in its effects as lager bier, ale and porter; it is not so highly alcoholic as to produce intoxication when taken in any moderate quantity; it is not so disturbing to the nervous system and the liver (the bile) as coffee; and it is not, perhaps, more depressing in its action, when used immoderately, than strong tea.

Wine of this character has been made very successfully in Central Ohio and Missouri, in some of the Southern States, in Central America and California. The light wines of California have lately been much praised. But these wines have not yet been very commonly employed by the American people as a beverage. Occasionally we see them placed on the wine lists of our hotels, and the sign "Catawba Cobblers," we have noticed, has become quite common in the fashionable bar-rooms. But the people still adhere to their fiery and poisonous alcoholic drinks, to bad whisky, adulterated and manufactured brandy and drugged beer, and neglect the pure juice of the grape to a very great extent.

There can be no question that the health and happiness of mankind would be greatly promoted if they would discard the use of any kind of wine (which must, of course, contain a certain amount of alcohol to constitute it *wine*) as a daily drink or beverage. Some persons, indeed, are so unhappily organized, that they cannot take the smallest quantity of alcoholic wine or liquor into the stomach without the most certain destruction to their health and happiness. But still wine, brandy, &c., are often used as medicines, and are much employed at the present time in our military hospitals as stimulants; and there are many persons who can use any and all of these alcoholic liquids pretty freely for years without very injurious consequences. Mankind, in fact, seem perversely determined to stimulate and narcotize themselves, the world over, and it may be the part of wisdom to induce them to use the least destructive forms of stimulation. Hence, it may be advisable to extend the manufacture of light American wines of the character before alluded to, and to exert our influence to introduce them into common use as a beverage in place of the alcoholic liquors, ale and beer, now so universally and largely consumed in this country. As an additional argument on this point, it may be stated that most of the beer and ale now made in the United States has a large quantity of cheap, and often bad whisky added to each cask, in order to impart to these drinks the intoxicating quality generally demanded by the consumers.

As to the question of profit to be derived from the manufacture of light American wine, it is believed, that as a branch of industry it is rather more profitable, where the grapes will ripen, than the cultivation of wheat and corn.

In relation to the probable capacity of the soil and climate of the United States to produce wines of a high character, equal, if not superior, to the best wines of Europe, and also in respect to the prospect that wine grapes, which will bear vineyard culture, of the proper quality to form such wines, will be obtained by hybridization or otherwise, no doubt is felt by those who are best informed on this subject. We have already numerous natural seedlings and hybrid grapes of great promise, not yet fully tested, and more are annually produced and discovered by our zealous cultivators. It is not, perhaps, fully settled that some locality may not yet be found in our widely-diversified Union, where the best wine grapes of Europe will grow with as much success as in the countries where they are now cultivated. It should be borne in mind that the wine grapes of Europe are not natives of the countries where they are now grown in vineyards; nor have the States of Europe any thing like the same number of native varieties of the grape that we have in America. So there is hope for American success in wine-making, as well as in the production of wheat and corn, and in all the arts of peace and war.

The World in Miniature.

As familiar to our *eyes* as "household words" is the photographic album with its well-selected gallery of household friends and distinguished public characters. It is astonishing to what an extent the business of producing *cartes de visite* (or small-sized photographs) has risen within the past two years. It has superseded the daguerreotype and ambrotype entirely, and now constitutes the chief adornment to thousands of parlor center-tables. You cannot do your friend a kinder service than to present him or her with one of these tasty albums. Among the leading artists in this city, who can supply all the wants of the public in this novel art, are Messrs. J. Gurney & Son, No. 707 Broadway. They have recently added to their collection of cards, a series of pictures of all the leading editors of the New York press; and so far as we can judge, we think they add another testimonial to the skill of those well-known artists. Their recently-issued catalogue contains a list of the most eminent personages in the world, whose pictures can be had for insertion in albums for a trifling sum.

Discoveries in Ancient Africa.

The *Africain*, of Constantia (Algeria), states that the excavations now being made on the site of the ancient Numidian town of Tiddis, on the banks of the Rummel, have brought to light several inscriptions which prove that place to have been still inhabited under the Byzantine Empire. A great number of silos or corn-pits, lined with masonry, have also been discovered, showing that this mode of preserving corn was then employed in cities, though it has long been supposed that it was introduced by the Arabs. On the plain of El-Heri, not far from this ancient city, stands the mausoleum of the Senator Lollius, the friend of Marcus Aurelius, from which it is inferred that even the highest functionaries of Rome personally superintended the cultivation of their estates in Africa.

Petroleum is selling at Oil City for $2 75 per barrel, and prices are advancing. In one day lately 9,000 barrels were floated down Oil Creek.

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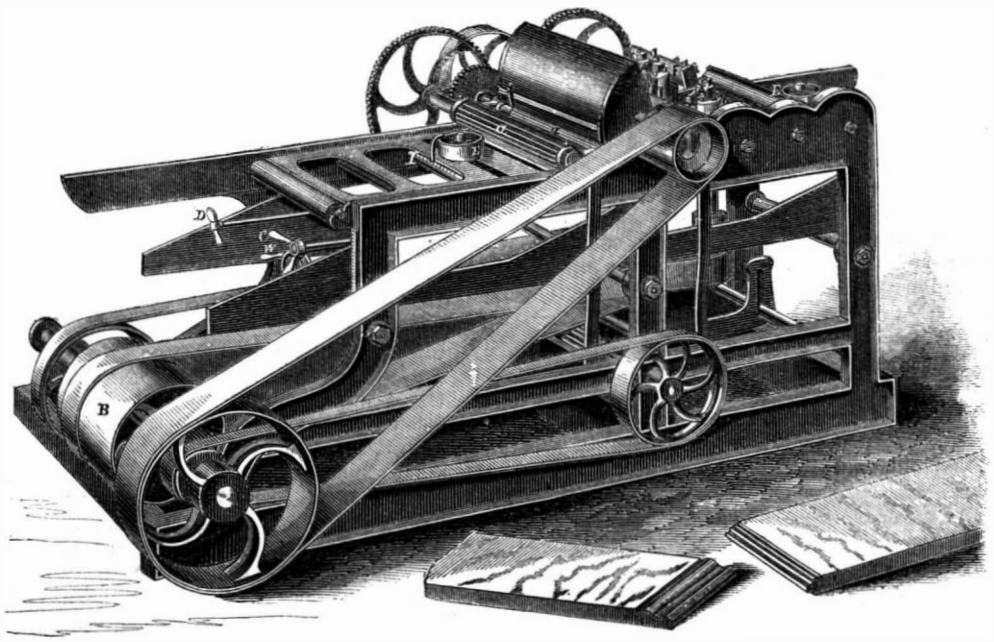
Improved Universal Wood-working Machine.

The machine here illustrated is an improved Woodworth planer, being a tonguing, grooving, beading and molding machine combined. It is so constructed that it will plane, tongue and groove at the same time, or perform the latter operations without planing, or any or all of the different processes at will. Similar changes may be performed upon the edges of the stuff, such as clapboards and window casings, or large and small moldings of any form that may be desired can be executed. In short, the usual work done by carpenters and ornamental wood-workers, which is generally performed on several machines, can by the use of this invention be done upon one.

The letters will be sufficient to give a clear idea of the several parts. A A are the two tongues and groove cylinders being driven by belts from the counter-shaft, B. The head, A, is stationary while the other is moved for different widths by the handle, C, and gaged by the scale, I; the thumb-screw, D, then secures the whole firmly. E E are pressure rollers to hold the board edgewise against the side of the bed, while being tongued and grooved, and are moved across the bed for different widths by the handle, C, at the same time with the cylinders, A1, and are secured by the same apparatus. F is the beading cylinder and has two knives; the planing cylinder has three knives with molding cutters between them. W is the hand wheel which raises or lowers the table carrying the two cylinders, A, and A1, with it to work different thicknesses.



WHITTLESEY'S UNIVERSAL WOOD-WORKING MACHINE.

The stuff is fed under the grooved rollers, *a a*, and there are also two smooth rollers which hold the board down as it leaves the knives, so that it is prevented from springing up and being thereby cut thinner than other portions.

The machine is very strongly made and not liable to derangement. The inventor says it will plane, bead, tongue and groove 1,000 pieces, 12 feet long, in ten hours. Further particulars may be had by addressing C. C. Whittlesey, Malone, N. Y.

THE PETROLEUM TRADE.

The rapid and extended use of petroleum has no parallel in the history of manufactures or commerce. It is but three years (Aug. 1859) since petroleum was first obtained in any notable quantities in the valley of Oil Creek, Pa.; and yet in that short period its employment for artificial illumination has spread over all parts of the civilized world and the distant islands of the sea. The obtaining of it from the oil wells, the refining of it, the carrying of it to market and the export of it abroad, combine to form a new manufacturing and commercial business for America, of great extent, which is the source of no small amount of wealth. Its rapid growth is proven by the fact that in the first nine months of 1861 the exports of it amounted to only 368,940 gallons, while in the same time in the current year they amounted to 6,294,819 gallons—an increase of no less than 5,925,879 gallons. From the 1st. of January last up to the 7th of this month, there was exported from the three ports of Boston, New York and Philadelphia, 7,887,768 gallons, valued at $2,040,750. Australia, China, New Zealand and the West Indies, have received cargoes, but the greatest quantity went to Europe, and no less than 4,101,437 gallons to Great Britain.

In a circular recently issued by A. Macrae, the great oil broker in Liverpool, it is stated that from the 1st of January up to the 18th of October last there were received at Liverpool, of crude and refined petroleum 200,000 casks valued at $3,000,000; this includes Pennsylvania and Canada petroleum. Crude American is now selling at Liverpool for $100 per tun; it was selling in May last for only $40 per tun. Benzine (the lightest refined oil) is in large demand. There is also a great demand for the heavy lubricating American petroleum. This circular says: "The oil exported from America and Canada in 1862 (the first year of its European introduction) exceeded in value £1,000,000. Yet, one tithe of its dissemination is not effected; Britain has manipulated pretty freely, so have France and the German States, but so clamorous are they for more that the export extension cannot be made sufficiently general. Spain, Portugal, Italy and Russia have yet to receive it in the crude form."

Light Wanted.

A movement is being made to require the placing of lights upon all vehicles that remain within the Central Park after sunset. Kerosene oil is perhaps the best material that can be used for the purpose, owing to its cheapness and great brilliancy. But further invention is necessary in order to produce a lamp that is capable of burning the oil when subjected to the jolting and wind currents of carriage driving. Here is a chance for the ingenious.

ANDREW'S PATENT TOBACCO PIPE.

Since mankind will persist in fumigating themselves into a state of exhilaration it is desirable to have some improved method devised whereby the operation can be performed with as little injury to the health as possible. The market contains many

different kind of pipes, but we think the invention of Mr. T. C. Andrews, of Philadelphia, Pa., which we herewith illustrate, one of the neatest as well as the most salutary novelties of its class. It consists of an ordinary wooden bowl, A, and stem, having a chamber, B, inside, made of porous clay, loosely slipping into it. This chamber is perforated at the bottom and allows all the moisture, which usually collects when smoking, to settle in the wooden portion, as well also the nicotine, which is the most noxious principle of tobacco. The chamber can be removed and burnt out in the fire when it becomes foul, so that its sweetness is renewed, or a new one may be inserted if desirable. An elastic ring of felt, *c*, is secured to the internal part of the outer bowl and the inner chamber pressed down and confined by an ornamental ring or cap, D, which surmounts the whole, thus presenting a very attractive appearance. This pipe was patented, Jan. 21, 1862, by T. C. Andrews. The agents, Messrs. Jones and Evans, 631 Arch street, Philadelphia, will supply any further information desired.

EXPERIMENTAL FIRING OF THE BIG GUN UPON THE "PASSAIC."

A few weeks since the gunboat *Passaic*—which has been already described in our columns—made her first trial trip, to test her machinery and also the firing of the huge 15-inch gun in her turret. The experiment with the gun was of great consequence, as it is the largest piece of ordnance ever tried on shipboard. As the port-hole for the gun is only 17 inches in diameter, and the face of the gun is nearly 29 inches in diameter, the shot has to be fired through the hole, because the muzzle cannot enter it. The recoil of the first shot was so great that a large quantity of the smoke from the discharged powder remained inside of the turret. To remedy this evil a muzzle-box was constructed for the turret, and a second trial trip of the *Passaic* took place on Saturday, the 15th inst., but with results little more favorable than on the previous occasion. The vessel proceeded some distance up the Hudson river, and three shots were fired toward the Palisades. The gun was first charged with 20 lbs. of powder and a shell of 330 lbs. weight. Two other shots were then fired, with similar shells and 35 lbs. of powder, when the muzzle-box burst, and the vessel returned; but fortunately no lives were lost. New experiments are now in preparation.

The mechanism for operating this gun was invented by Captain Ericsson, and has been highly commended; no offensive jarring from the recoil of the discharge was experienced inside of the turret. A short time since we pointed out the ignorance of the London *Times* in descanting upon the working of navy guns. The British "Thunderer" stated that it was impossible to operate guns over five tuns weight on ship-board. In the case of the *Passaic* its big Dahlgren gun, weighing nearly 19 tuns, was handled without difficulty by half a dozen men. The largest guns hitherto used in our navy have been 11-inch Dahlgrens; the largest smooth-bores in the British navy are only 8-inch or 68-pounders. The employment of such large guns as the one placed in the *Passaic* is a new and important step in naval warfare. As the diameter of the bore of a gun is increased, the weight of the spherical shot increases according to the cube. Thus, while a round shot, for an 11-inch gun, contains 696·91 cubic inches, the round shot of a 15-inch gun contains no less than 1767·15 cubic inches; hence the necessity for making guns proportionally so much heavier as the bore is increased. The speed of the *Passaic*, on her second trip, also exceeded that of the first trip by more than one knot per hour.

SHEEP-SHEARING MACHINERY.—A correspondent writing from California states that there is great want of a sheep-shearing apparatus in that State, and he inquires if such an invention has ever been successfully introduced into the Atlantic States. There are several existing patents for machines of the kind, but we cannot learn that they have been practically valuable. It is a subject worthy of attention, and such an invention, if practicable, would be valuable.

ANOTHER mass of copper, nearly pure, has recently been discovered in the Mesnard district, Mich. It is forty feet in length and about four feet broad, by as many in hight. It weighs about 50 tuns.

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MANUFACTURE OF ARTIFICIAL STONES INSTANTANEOUSLY WITHOUT BURNING.

Although molded blocks of cement and dry clay have been used for building, nothing but burned brick has been or is employed to any extent. A new and most remarkable artificial stone—one which is perhaps destined to supersede brick and cut natural stone—was brought under the consideration of the British Association for the Advancement of Science, at Cambridge, by Professor D. T. Ansted, F.R.S. In a paper read by him upon artificial stones for buildings, he stated that during experiments made in the laboratory, for the purpose of preserving building stones from decay, by Dr. Frankland, Prof. Hoffman, Mr. Abel and himself, (all distinguished chemists) being members of a government scientific committee, they were waited upon by Mr. Ransome, who astonished them by his discoveries in this line. He saturated the surface of a stone with the silicate of soda (liquid flint) and then applied a solution of the chloride of calcium, when a rapid double decomposition was effected and an insoluble silicate of lime was left within the pores of the stone. Common salt was formed on the outside by the chlorine of the chloride of calcium uniting with the soda of the silicate, and when the salt was washed off, a hard silicate of lime was left as a coating. Mr. Ransome then made small blocks of various forms, by mixing sand and silicate of soda (liquid quartz) together, forming a plastic mass, which was then molded, and while still moist these molds were dipped into the chloride of calcium. To the surprise of all the chemists present, those molded articles were found to be almost instantaneously converted into perfectly hard and solid blocks, which were apparently quite durable. The members of the committee then molded some of these blocks themselves and performed the experiments as successfully as Mr. Ransome.

The above-described composition forms a new artificial stone which apparently can be manufactured economically in almost every part of the world. Stones made in this manner have been tested as to their strength in forming the bed of a steam engine in the Great Exhibition, and they have also been used in building two of the new stations of the Metropolitan Railway in London. Professor Ansted stated that this material seemed to combine cheapness with durability, and resistance to the action of the weather, to an extent hitherto unknown. The transverse strength of a stone thus made, 4 by 4 inches, resting one inch at each end upon iron supports and leaving 16 inches clear space between, was equal to 2,122 lbs. A bar of Portland stone of the same dimensions, similarly tested, broke with 759½ lbs. upon it. Its adhesive power was also found to be superior to Portland, Bath and French (Caen) stone. A four-inch cube of it sustained a crushing weight of 30 tuns. Mr. Ransome in the presence of the British Association manufactured some of these stones in a few minutes. They were composed of pieces of limestone and sandstone mixed with liquid silicate of soda, and formed into a plastic condition, placed in molds then dipped into a solution of the chloride of calcium. The silicate of soda was formed by digesting flints in a steam boiler underpressure containing alkali. (Hardinge's process undoubtedly.) These artificial stones were then handed around for the astonished men of science to examine.

This molded stone is a very remarkable invention, and it deserves universal attention. The decay in any stone buildings may be arrested by the same method of treatment, namely, by washing the stones first with a solution of the silicate of soda, then with chloride of calcium. It will undoubtedly require the experience of several years to test the durability of such stones, but as far as chemical science affords a basis for passing judgment upon them, they appear to be indestructible. By this process, molded artificial stones of a great variety of forms and of any size may be manufactured, so as to obviate the immense expense and labor of quarrying and cutting rock in the old and usual modes to obtain blocks for building purposes.

DUTIES OF CORNISH AND LOCOMOTIVE ENGINES.

A very high opinion is generally entertained respecting the economical working of Cornish engines. These are pumping, single-acting, condensing engines, in which the steam is highly expanded. As some of them raise water from mines 1,800 feet in depth, and as the weight of some of their pump rods, &c., is about 50 tuns, of course they must move very slowly to prevent breakage. The duty of an engine means the weight in pounds which it elevates by a certain weight of fuel, such as 500,000 lbs. lifted one foot, by the consumption of one pound of coal, independent of time. In the *Engineer* (London, Oct. 17th) J. Dixon, C. E., compares the duty of Cornish engines with locomotives, and shows that the latter give the highest. He states that the number of Cornish engines reported for the month of August last was 31; that they consumed 214 tuns of coal, and lifted 16,100,000 tuns of water 10 fathoms high. The average duty, therefore, was 51,300,000 lbs. lifted one foot, to 112 lbs. of coal consumed, or 458,035 lbs. to one pound of coal. A locomotive of 18-inch cylinder and 24-inch stroke, with wheels 5 feet in diameter, running at the rate of 26·19 miles per hour, or 2304·72 feet per minute, and working up to 360 horse power, raised 53,530,773 lbs. one foot high, per 112 lbs. of coke, or 477,953 lbs. raised to one pound of coke. This exceeds the duty of the Cornish engine mentioned by 19·918 lbs. to each pound of fuel consumed. The water used by the locomotive was 13·50 gallons per hour, or 3·75 per horse power, or 10 lbs. for 1·1 lbs. of coke.

The duty of these Cornish engines is quite low in comparison with many others, according to published reports. Thus the duty of two English pumping engines, recorded in the report (for 1860) of the Brooklyn Water Works, page 19, using the best Welsh coals, was 946,974 lbs. lifted one foot per pound of coal. In the same report, the duty performed by the Brooklyn (N. Y.), the Hartford (Conn.), and Belleville (N. J.) pumping engines, is given for the former at 601,407 lbs. lifted one foot to 1 lb of coal; the second engine 616,371 lbs.—average of three trials—and the Belleville engine 628,238 lbs. The latter is a Cornish engine and cuts off at about one-half of the stroke; the Hartford is a crank engine and cuts off at one-eighth of the stroke, which does not appear favorable to high expansion. The Brooklyn engine is of peculiar construction. It is situated in an elegant building on the level plain below Cypress Hills, L. I., and it raises water into large reservoirs at Ridgewood, and from thence it flows in a conduit by gravitation to Brooklyn, and is distributed through pipes to supply the city. It was built by Woodruff & Beach, Hartford, Conn., and has been in operation since the beginning of January, 1860. Its diameter of cylinder is 60 inches, stroke of piston 10 feet, length of walking beam 30 feet, and weight of it no less than 25 tuns. The hight of the engine above the floor is 26 feet 3 inches, number of pumps two, stroke 10 feet. Their capacity per double stroke is 137·65 cubic feet. The valves are of the double-beat kind. The diameter of the double-acting air pumps is 3 feet, stroke 5; diameter of air chamber 78½ inches, hight of it 25⅓ feet. The weight of engine, boilers and appurtenances is 440 tuns. It is a massive and splendidly-constructed engine. The depth of the bottom of the pump well, below the floor, is 37 feet; the water is forced through a pipe 3 feet in diameter, length 3,450 feet, and the lift is 170 feet. It delivers ten millions of gallons every twenty-four hours.

Experimental tests with engines are not so valuable as the records of daily workings by careful engineers, extending over a considerable period of time. When experimental tests are made for the purpose of obtaining the best results possible, of course everything favorable to secure such results is provided. In the Cornish mining region, where coal is very expensive, every pound that can be saved is of much consequence. A record of the duty of the pumping engines in that part of the world is published monthly, and all the proprietors and engineers are incited to do their best, in order to obtain the highest possible duty. These may be called regular working tests, not mere experiments of a few hours' duration. A practice of a similar character is now pursued by our railroads with their engines. It is highly commendable, because such records of engine workings afford data for comparing the efficiency of engines, one month with another, and when it is found that there is a falling-off of duty, is is a sign that something is wrong. We have been informed that the saving of oil, fuel, and general working expenses of locomotives on our railroads amounts to more than twenty-five per cent. since the custom of publishing monthly reports was instituted.

WINDS AND THE LATE SNOW STORM.

Some of the phenomena connected with the late storm entitle it to fuller notice than it has yet received in the daily journals. We do not refer to the depths of snow which fell, or the violence and duration of the gales; but to the course of the winds previous to its outbreak and during its continuance, and to the path of the storm itself. In all these respects it was of a very unusual character in these latitudes.

The ordinary history of rain or snow storms on the North Atlantic coast is substantially this: Atmospheric currents set in from the sea toward the interior, blowing from the South-east with more or less velocity. Should they last for three or four days together they are certain to be followed by a very heavy precipitation; should they increase in strength rapidly, rain may be expected shortly, perhaps the ensuing evening or night. It is difficult to lay down rules which will apply to all seasons of the year, but those we have mentioned will be seldom found to fail. The doctrine is that in these localities nearly all the moisture which returns to the ground in the form of hail, rain or snow, has its source in the Atlantic ocean; while the Southern States are supplied both from the Atlantic and the Gulf of Mexico. The west or north-west winds are cold, dry and highly magnetic. It is the collision between these and the warm, moist breezes from the ocean that leads to the phenomenon which is usually designated a rain or a snow storm according to the season when it occurs.

The atmosphere having been saturated with this moisture, all that is required to "wring it out" is contact with a cooler current, which in nearly every case makes its appearance from one of two directions. In the spring and autumn the storm frequently begins in the south-west, on the coast of Florida or the Carolinas, and passes up through Virginia and the intervening States to the North. In such a case the outbreak is sure to be preceded by a raw, chilly north-east wind; its duration being in proportion to the quantity of rain following, and to the violence of the gales near its center. A very common hour for one of these so-called north-east (but really south-west) storms to break out in this city is between seven and eight o'clock, A.M. After expending its strength it is invariably succeeded by the bracing north-wester, which, however, sometimes bends around toward the north for a time, following in the wake of the tempest. Visitations of this class are ordinarily announced about half a day in advance by the Southern telegraph; but, before the war broke out, the intelligence was frequently brought hither as much as a whole day before the outbreak. At Boston it does not usually commence until from five to ten hours later, and at Halifax not until the ensuing morning.

Storms of this description are probably in every case the continuations of cyclones or typhoons passing up from beyond the Tropic of Cancer and striking on the Southern coast at some point where it is washed by the Gulf stream. The general direction

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of the latter and the coast line account for the path taken by the great devastator.

The other class begin at the west or north-west and pursue a south-easterly course toward the Atlantic, attended here by a strong gale from the sea which blows invariably toward the center of precipitation. Nearly all our summer rains and winter heavy snows travel in this manner, breaking out at Chicago or Detroit from twelve to twenty-four hours before they begin on this meridian. As the telegraph is unobstructed as far west as the Missouri, it is always comparatively easy to foretell the advent of one of these visitors, calculating its severity by the quantity of moisture in the atmosphere, its distance by the map and the time of its commencement by the strength of the wind current. No manner of doubt that it will be followed by the dry, whistling north-wester.

But the late storm belonged strictly to neither category. The winds which preceded it blew from the north and north-west, scarcely ever touching the north-east; at least such was the common experience for a considerable distance around this city. During its continuance the gale blew almost steadily from the north, shifting occasionally to the north-west, indicating that the axis of the cyclone (if it was such) lay to the south and east of us. Then, instead of gradually creeping up the coast it struck the whole line nearly at the same time. Thus, snow began to fall at Washington, Baltimore, Philadelphia and New York, between six and seven o'clock, A.M., on Friday, Nov. 7th. Little more than one hour later it appeared in Boston and other Eastern cities. At Fortress Monroe it had commenced raining at midnight, or six hours previous to the snow-fall at Washington.

The storm, therefore, began at a considerable distance out to sea, in a direction south by east from this city. It traveled thence toward the land and passed across the country toward the Mississippi, breaking out in Cleveland about one day later than in New York, but depositing two or three inches less snow. Beyond St. Louis it has probably been so light as not to merit special notice.

MANUFACTURE OF FELT HATS AND SEAMLESS GARMENTS.

Some species of fur and wool possess the property of what is called "felting;" that is, when the fur or wool is subjected in a wet condition to a rubbing and beating action, the fibers become interlaced and are drawn very firmly and closely together. Loose layers of wool, when they undergo the pounding action of a fulling mill, become felt cloth. Woven woolen cloth is also loose and thin until it undergoes the fulling operations. At one period fur hats were called "beavers," because they were usually formed of beaver fur, but since the gradual extermination of the beaver the fur of the rabbit, the hare, the muskrat, the lama and nutria are employed in the manufacture of hats. There are some very large establishments of fur hat bodies in our country, and such articles stiffened with gum shell-lac varnish and covered with silk plush are familiarly called "stove pipes."

Of late years soft hats have been very generally worn, and those which are made of fine wool are called "felt hats." They possess the quality of retaining their shape in a superior manner, which is a recommendation to their use. We will give a brief and general description of the operations connected with their manufacture as we witnessed them a few days since in the large factory at Matteawan, Dutchess county, N. Y.

The best qualities of wool from the Saxony breed of sheep are used for them. The wool is first selected with much care, then picked and assorted by persons who have long experience in the business. After being picked and prepared it is fitted for the carding machine into which it is fed at one end and is then carried forward by a "licker-in" roller to the "doffer" or card cylinder, and is carded and spread in a broad thin sheet, which is afterward delivered at the back end of the machine in a continuous piece upon the hat "former." The latter machine consists of a double rotating cone, also capable of moving back and forth while it rotates, and at the same time it rubs upon a series of under rollers. Several thicknesses of the sheet of carded wool are required to form a hat. By the double movements of the "former" the sheets are laid upon one another so as to cross and recross the fibers, and the under rollers press them closely together. By this arrangement of the fibers the body of the hat is made exceedingly strong when felted. The hats bodies when thus formed are next subjected to a slight felting action under the action of steam to "harden" them and fit them for the more powerful felting action in the fulling mill. This consists of huge wooden pounders that vibrate like great pendulums. A sufficient number of loose hat bodies to form a set are placed in the box of the fulling mill along with some strong soap-suds, and then subjected for several hours to a beating action, during which period they are also turned over continuously by the curving strokes of the stocks. In the fulling mill they become close and firm in texture and resemble conical pieces of thick cloth. When sufficiently felted they are washed to remove all the soap; then they are stiffened with a preparation of gum shellac, and afterward dyed such colors as may suit the public demand. The coloring operations require great care and skill, both as it regards the substances employed and the temperature of the dye vats, as an excess of heat, and some of the coloring ingredients tend to weaken the fiber. Black colors are chiefly dyed with the sulphate of iron, verdigris and logwood; fast blues are dyed in "woad vats," which demand much experience to manage properly. After being dyed the hats are blocked to give them the proper shape. A trough of hot water is adjacent to each hatter's bench and the hat bodies are kept in the water ready to be stretched on the blocks, which are of the size and form to give the hats the desired shape. The hatter lifts a hat-body smoking hot from the trough, stretches it with his hands and flaps it upon the block, then rubs it down upon the crown and sides, removing all the wrinkles. It is fastened on the block, the rim pressed out on the bench, and when completed placed on a light movable rack. The racks containing several blocked hats are removed to a hot room where they are dried, and they afterward retain their shape. After this they undergo the finishing operations of dressing, trimming and lining. The sewing is executed by machines, and a large number of girls are engaged in those operations. The very fine quality of wool necessarily used for such hats, together with the care bestowed upon the operations connected with their manufacture, have resulted in gaining for them very general favor.

In years long past and gone we remember to have seen a linen shirt that was woven without a seam to the very button holes. We looked upon *it* as a wonderful garment, and so it was; but it cost its enthusiastic author many months of thought and toil and for this he never was remunerated except with penniless praise for his patience and skill. Well, in this establishment there are seamless coats of perfect form made in large numbers daily. The fine wool used for their manufacture is first cleaned, then dyed the color required; then it is placed in the carding engine and formed into thin and broad continuous sheets. These are delivered upon a lapping, traversing machine at the back end of the carder. This machine traverses upon rails, and as the web of sheets revolves in one direction it is also moved back and forth in a reverse direction, and the sheets cross one another angularly. A web of woolen sheets thus formed is several yards in length. When completed it first undergoes a partial felting action by being placed in a long frame, subjected to the action of steam and a quick, gentle rubbing motion which makes the fibers interlace, and the web then becomes firm and capable of being cut into the forms and size required. The body of a coat for example, also the sleeves, are cut out of these woolen sheets; then, at those parts which in cut woven garments would form the seams, the fibers are interlaced by girls who are experienced in executing the operations, and the whole parts are joined together, forming a loose fibrous coat. Several of these garments in a batch are now subjected to the action of the fulling mill when they become strong seamless coats. After fulling and washing they are blocked and dried on hollow copper cases having moveable arms and otherwise shaped like the body of a man. The wet felted coats are placed upon these, smoothed and nicely adjusted, and being heated by steam the garments are thus dried into the perfect shape which they afterward retain. They are now trimmed and finished. The soft superior quality of wool required and used for those garments renders them warm and pleasant to wear. Fine blue "navy caps" and other caps of various forms and colors are also manufactured from such felted cloth.

VALUABLE RECEIPTS.

YELLOW INK.—Take 3 ounces of alum and 25 ounces of yellow French berries, and boil them together for one hour in 3 quarts of water, then strain and add 1 ounce of gum arabic. Saffron boiled in water, with a little alum also make yellow ink; and gamboge dissolved in water is sometimes also used. A solution of the bichromate of potash makes a yellow ink for writing upon paper that has been prepared with a solution either of the acetate or the nitrate of lead.

GREEN INK.—Take a solution of the neutral sulphate of indigo, and add to it a solution of bichromate of potash until the desired shade is obtained, then add a little mucilage. The sulphate of indigo is blue and the bichromate of potash yellow, and these two colors combined form a green. A solution of verdigris also forms a green ink; and so will a strong solution of the sulphate of copper, a decoction of fustic and a small quantity of logwood.

BLUE INK.—A solution of neutral sulphate of indigo (indigo dissolved in sulphuric acid, and the excess of acid then neutralized with chalk) makes a good writing blue ink which does not precipitate and requires no gum in it. The most beautiful blue ink, however, is made by dissolving Prussian blue in oxalic acid. The common Prussian blue of commerce, is first triturated in a mortar; then about its own weight of oxalic acid in solution is added, and the whole stirred together occasionally for about 48 hours. The oxalic acid renders the blue soluble; water is then added in sufficient quantity to enable the ink to flow freely, and a little gum arabic mucilage mixed with it. A porcelain mortar should be used for making this ink, as the oxalic acid would act upon an iron mortar.

RED INK.—Common red ink is made in the most simple manner by mixing common carmine with a sufficient quantity of aqua ammonia to flow freely from the pen. Any person can manufacture red ink in a few hours by this method. A cheaper red ink may be made by boiling 2 ounces of Brazil wood for half an hour in a quart of water, then straining it and adding half a drachm of the chloride of tin and 1 drachm of gum arabic. Such ink is used for ruling red lines on blank books. Carmine ink does not affect steel pens like that made with Brazil wood; none but quill or gold pens, however, should ever be employed with red ink. Liquid Solferino (aniline red) also makes a good red ink.

PURPLE INK.—Magenta or any of the liquid purple aniline colors, diluted with water and a little gum arabic added, makes a good purple ink. A decoction of logwood and Brazil wood, to which is added a small quantity of the chloride of tin, also makes purple ink. Carmine ink and neutral sulphate of indigo mixed together, make purple ink. Inks of all shades and colors may be made by using strong decoctions of the dyes that are employed to color cotton and silk; but black, red and blue are the only inks used in business.

GOLD AND SILVER INKS.—The following is the method described by Dr. Ure for making gold ink. Take gold leaf and grind it with white honey upon a slab of porphyry with a muller, until it is reduced to an impalpable powder, in a pasty condition. This golden honey paste is then diffused in water which dissolves the honey, when the gold falls to the bottom in the form of very fine powder. The honey is then washed off carefully and the gold powder thus obtained is mixed with gum arabic mucilage and forms the gold ink. When used, it is allowed to dry on the paper, then it may be burnished with an agate burnisher, when it becomes brilliant. Silver ink is prepared in the same manner, by substituting silver for gold leaf.

THERE were forged recently at the Pembroke Forge, South Boston, Mass., two stoppers or shields, for the port-holes of the turrets of the *Monitor* now being built at East Boston. Each weighs about five tuns of solid iron.

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ERICSSON'S IRON-CLAD "PASSAIC."

This vessel was armed and apparently completed nearly a month ago, and ought ere this to have been thundering with terrific roar before the walls of the strongholds of Confederate treachery. But instead of sturdy service like this, the time and the giant's power have been wasted in new experiments, and the vessel idly remains tied fast to the dock. What is the reason of this unaccountable delay? Simply this: the port-hole is too small to allow the muzzle of the great gun to pass out, and the parties interested wont enlarge it, but insist on hooding the muzzle.

We all remember the rapidity with which the *Monitor* was equipped and sent into action. Her port-hole was large enough for the gun to run out, and her success, how splendid and glorious it was! Now why not adopt the same plan on the *Passaic?* Has common sense departed from the projectors and from the Secretary of the Navy, that they are content to fritter away the golden moments of the present in new experiments, when well-tried, practical methods stand ready before them?

We do not say that the fire of a 15-inch cannon having a 28-inch muzzle cannot be safely delivered through a 17-inch port. But this we say: Delay no longer. The nation waits impatiently for the vessel. Transfer your experiments to the shore. Enlarge the *Passaic's* port-hole. Run out the great gun and blaze away at the vaunting enemy!

The *Passaic* went on a second experimental trip a few days ago to try the new muzzle hood. We were not invited to be present, but certain puffers of the city papers were, and they gave to the public next day the most glowing accounts of the "complete success" of the new devices. In addition to this the speed of the vessel was put at 7 miles an hour, using only a fraction of her power. Capt. Ericsson was crowned with a cart-load of fresh laurels, and all the admirals and experienced men who had previously felt doubtful of the results were denounced in unmeasured terms. Now, as we said before, we were not there; but we are reliably informed that the total results of the said experimental trip may be correctly summed up as follows:—The vessel made 5 miles an hour, three shots were fired, the muzzle hood was torn to pieces, and the vessel came back to await the construction of something new.

RECENT AMERICAN INVENTIONS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list.

Spring Hook.—This invention relates to an improved spring hook or fastening, more especially designed for soldiers' india-rubber wrappers or blankets, to secure the same on the wearer, and also to fasten the wrappers or blankets together to form tents or coverings for a number of men. The inventor of this device is Abel Putnam, of Chester, Vt.

Guide Attachment for Taps.—This invention consists in the employment of a bell-shaped case provided with a tubular socket at its smaller end, through which, and the case, the tap or other tool passes, and using in connection with the case aforesaid a spring, placed on or so arranged in relation with the tool and case that the latter will, as the tool is turned and commences its work, firmly adhere to the surface of the article being tapped, reamed or bored, and serve as a guide for the tool, so that the latter will work perfectly true and without any special care on the part of the operator. W. S. Hadley, of Norwalk, Ohio, is the patentee of this improvement.

Dies for Pressing Hats.—This invention relates to dies which form the whole of a hat at one operation. The dies heretofore constructed and extensively used for that purpose have had that portion of the upper die, which operates to produce the brim of the hat so constructed as to press upon the whole of the upper surface of the brim. The pressure upon the whole of said surface is objectionable in the manufacture of felt hats, for the reason that owing to the said die being heated, the shellac solution, which is used to stiffen the hat, is thereby caused to stick down and partially glaze the surface fibers and so spoil the appearance of the said surface; this, in some hats, is the only part of the brim exposed to view. T. Bracher obtained Letters Patent, dated Dec. 3, 1861, for the substitution of a stretcher for the upper die, such stretcher being a mere frame and incapable of being heated. Practical experience, however, shows the use of an upper die to be preferable. In order to obviate the aforesaid objections to its use, this improvement consists in so constructing the face of the portion referred to, of the upper die, that it only touches the brim close to its junction with the sides of the crown and at its extreme outer edge, but that it applies or confines the heat over the whole upper surface. R. T. Wilde and S. H. Lyon, of Brooklyn, N. Y., are the inventors of this improvement.

Oscillating Engine.—The first part of this invention relates to the construction of oscillating engines with a valve seat and valve arranged lengthwise of the cylinder in the form of cylindrical arcs concentric with the axis of oscillation, to effect the induction and eduction of the steam to and from the cylinder by the oscillation of the cylinder. It consists in the construction of the valve face on the cylinder in an arc of such radius extending the whole length of the cylinder that, if continued to a complete circle, it would entirely circumscribe the cylinder, thereby not only enabling it to be faced in a turning lathe, but obtaining the greatest possible length of valve seat and valve; the valve seat being faced to correspond, and its face being as much longer than that of the valve, and consequently than the cylinder, as to keep the whole length of the valve face in contact with it during the entire oscillation of the cylinder. The second part of the invention consists in a certain mode of applying springs to the trunnion boxes and in relation to an arc-formed valve face and seat arranged lengthwise of the cylinder so as to permit the trunnion boxes to adjust themselves to the expansion of the cylinder valve and seat whenever desirable. W. D. Andrews, of New York City, is the inventor of this improvement.

Evaporator for Saccharine Liquids.—This invention consists in the arrangement of three or four separate pans each communicating with each other by means of faucets, or their equivalents, placed at different levels, and in such relation to each other that the liquid can be made to flow with more or less velocity successively from one pan into the other, each pan being provided with a series of transverse partitions in combination with strainers fitting loosely on said partitions, in such a manner that the same can be adjusted in the proper position to allow the liquid to pass through them in flowing from one pan to another, and that during this operation the scum and other impurities are easily separated from the sirup. It consists also in the arrangement of narrow central openings in the partitions at or near to the bottom of the several pans, in such a manner that, in boiling the liquid, an under reverse current from the sides of the pans to their center is produced, and every particle of the liquid running through the pans is compelled to pass over the hottest part of the same, and no portion of the liquid is permitted to remain in any of the pans, whereby it would be burned and impart to the sirup a dark color and unpleasant taste. M. H. Smith, of Four Corners, Ohio, is the inventor of this improvement.

Weather Strip.—This invention consists in the arrangement of a stationary inclosed strip attached to the lower inside edge of a door, in combination with an arm or tappet extending from and firmly attached to a rising and falling strip or plate, which turns on suitable hinges on the sill, in such a manner that by closing the door the stationary strip comes in contact with said tappet, and causes the hinged plate to rise and to underlap the lower edge of the stationary strip, and that by these means the crevice between the lower edge of the door and the sill is effectually closed. This invention has been patented by J. O. Clay, and further information in regard to the same can be obtained by addressing the assignee, F. C. Gridley, Hudson, Wis.

The Pneumatic Parcel Delivery Company, whose system is illustrated on page 209, Vol. V. (new series), Scientific American, are laying down tubes in London to extend from one end of the city to the other. When their communication is established between the extremities of the metropolis, parcels, books and messages will be placed in a tube at one end of London and blown out at the other.

"SOME PUMPKINS."

Our neighbor Judd, of the *Agriculturist*, with characteristic enterprise, has lately been having a pumpkin show at his establishment, No. 41 Park Row, in this city. We dropped in, the other day, among the crowd of visitors, and found ourselves amid worlds of pumpkins. There were pumpkins in the rear, pumpkins at the sides, pumpkins above, pumpkins below—in short nothing but pumpkins from Park Row through to Nassau street.

The first prize ($20) for the largest specimen was awarded to W. D. Hall, of Wallingford, Conn., and it is truly a pumpkin monster. It is nearly round, weighs 270¼ pounds, and measured 8½ feet in circumference.

Mr. Hall also took the first prize ($10) for the largest yield on a single vine. This exhibit consists of forty-two splendid specimens, comprising an aggregate weight of 1,259½ pounds.

G. A. Spaulding, of South Woodstock, Conn., exhibits a great sample of the cream pumpkin. J. A. Jowineay, of Tottenville, Staten Island, shows a marrow squash weighing 92½ pounds. Among other curiosities are 200 different varieties of gourds. These exhibitions of specialities are promotive of much benefit, for they serve to arrest the attention of cultivators and lead them to emulate every improvement.

Government Loan.

The Secretary of the Treasury has recently advertised for bids for a Government loan of $13,420,550, in 7-30 per cent Treasury Bonds. The amount offered was $30,000,000 at premiums varying from one to three per cent—which appears to us very satisfactory in view of the enormous expenditures necessary to carry on the war. If the Government would now commence to fund the legal tender notes in bonds varying in sums for $20 to $1,000, bearing a rate of interest not exceeding 4½ per cent, and at the same time make these bonds a legal tender for the payment of debts, we think the confidence of the people in issues of the Government would be greatly strengthened. The time will come when 4½ per cent interest will be regarded as much too small, and the Government will not be able to make such satisfactory terms as at present.

Quite Complimentary.

The editor of the Pittsburgh *Dispatch* in referring to the patents published in this journal says:—There is no paper in the country better edited, or more devoted to scientific and mechanical interests, than the Scientific American, and after years of careful perusal we heartily endorse the opinion that it is the most reliable paper in this country, on mechanical subjects. The unqualified endorsement of any piece of machinery by its editors is sufficient guaranty for its wide circle of readers. A carefully prepared account of recent foreign and American inventions is given in each number, together with a full weekly list of patents granted, and a valuable miscellany of scientific papers and mechanical discussions.

Great Advance in the Price of Coal Oil.

Three months ago coal oil was selling in New York for 32 cents per gallon; it is now selling at one dollar per gallon by the cargo. Benzine, which was a drug in the market at 84 cents per gallon about the time when coal oil was selling at 32 cents, is now worth about the same as coal oil. Any person who will invent a coal oil lamp which will give a greater light with less consumption of material than the kind now in use will be sure to realize a fortune from his invention, if it is brought out immediately. Who will be the lucky man?

The Gunboat "Naugatuck."—The Stevens gunboat *Naugatuck*, which has been lying off Hoboken for repairs since the bursting of her 100 pound rifled gun, has been thoroughly repaired and will leave for Washington, where she has been ordered, in a few days. A 120-pound James's gun has been mounted in place of the rifled gun.

Orders have just been telegraphed from Washington, that the frigate *Roanoke*, which is now being plated at the Novelty Works, in this city, must be completed with all possible dispatch and retained for the defense of New York harbor.

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"Chalk your Bobbins!"

Every one knows that old Sir Robert Peel, father of the late prime minister of England and grandfather of the present baronet, made his money by the cotton spinning. In the early part of his career his business was not remarkably extensive, but suddenly he made a tremendous start, and soon distanced all his rivals. He grew immensely rich, as we all know, but we do not all know the lucky accident to which he was indebted for his enormous wealth.

In the early days of the cotton spinning machinery, a great deal of trouble used to be caused by filaments of cotton adhering to the bobbins or tapes which then formed portions of looms. These filaments accumulating soon clogged the wheels and other parts of the machinery, and rendered it necessary that they should be cleared, which involved frequent stoppages and much loss of time.

The great desideratum was to find out some plan of preventing this clogging by the cotton, and Sir Robert, or Mr. Peel as he was then, spent vast sums in experiments. He employed some of the ablest machinists in the kingdom—among them James Watt—who suggested various corrections, but spite of all they could do, the inconvenience remained—the cotton would adhere to the bobbins and the evil appeared to be insurmountable.

Of course, these delays seriously affected the wages of the operatives, who, on Saturdays, generally came short in proportion to the stoppages during the previous days. It was noticed, however, that one man always drew his full pay—his work was always accomplished—in fact his loom never had to stop, while every other in the factory was idle. Mr. Peel was informed of this, and knew there must be a secret somewhere. It was important that it should be discovered if possible.

The man was watched, but all to no purpose; his fellow workmen tried to "pump" him, but they couldn't; at last, Mr. Peel sent for the man into his private office.

He was a rough Lancashire man—unable to read or write—little better indeed than a mere animal. He entered the "presence" pulling his forelock, and shuffling on the ground with his great clumsy wooden shoes.

"Dick," said Mr. Peel, "Ferguson, the over-looker, tells me your bobbins are always clean, is that so?"

"Ee's master, 't be."

"Well, Dick, how do you manage it—have you any objection to let me know?"

"Why, master Pill, 't be a soart o' sacret loike, ye see, and if oi told, t' others 'd know 's moch as oi," replied Dick, with a cunning grin.

"Of course, Dick, I'll give you something if you'll tell me—and if you can make all the looms in the factory work as smoothly as yours."

"Ev'ry one 'n them, master Pill."

"Well, what shall I give you? Name your price, Dick, and let me have your secret."

Dick grinned, scratched and shook his great head, and shuffled for a few minutes, while Mr. Peel anxiously awaited his reply. The cotton lord thought his servant would probably ask a hundred pounds or so, which he would most willingly have given him. Presently Dick said:

"Well, master Pill, I'll tell 'ee all about it, if you'll give me—a quart o' beer a day as long as I'm in the mills—you'll save that ten."

Mr. Peel rather thought he should, and quickly agreed to the terms.

"You shall have it, Dick, and a half gallon every Sunday into the bargain."

"Well, then," said Dick, first looking cautiously around to see that no one was near—"this it be," and putting his lips close to Mr. Peel's ear, he whispered: "Chalk your bobbins!"

That indeed was the great secret. Dick had been in the habit of furtively chalking his bobbins, which simple contrivance had effectually prevented the adherence of the cotton. As the bobbins were white the chalking had escaped detection.

Mr. Peel was a sagacious man, and saw through the affair at a glance. He at once patented the invention—had "chalking" machinery contrived, and soon took the lead in the cotton spinning department. This was the foundation of his princely fortune. It is but right to add that he pensioned off Dick handsomely.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING NOVEMBER 11, 1862.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

36,884.—Edwin Allen, of Newark, N. J., for a Carriage or Movable Bed for Forming and Planing Machines:

I claim the movable carriage when constructed and operated by the jointed levers, in the manner and for the purpose herein above specified.

36,885.—W. D. Andrews, of New York City, for an Improvement in Oscillating Steam Engines:

I claim, first, The construction of the valve face on the cylinder in the form of an arc of such radius extending the whole length of the cylinder concentric with the axis of oscillation thereof that if continued to a complete circle it would circumscribe the whole cylinder, thereby not only obtaining the greatest practicable length of valve face, but allowing the said face to be turned in a lathe while centered therein for turning the trunnions, substantially as herein described.

Second, The springs, E, applied in combination with the trunnion boxes and in relation to an arc-formed valve face and seat, arranged lengthwise of the cylinder, substantially as and for the purpose herein specified.

36,886.—E. G. F. Arndt and Augustus Hühne, of Rondout, N. Y., for an Improvement in Locks:

We claim, first, The arrangement of the tumblers, f f, in their relation to the bolt and to the hub, so that the hub shall bear the thrust of the bolt when pressure is made at the outer end of it, as set forth.

Second, We claim the spring, n, as it is attached to and operates upon the hub, as described.

Third, We claim the guard-plate, t, in combination with the button, k, and tumblers, f f, as herein recited.

36,887.—Joel Arnold, of Elmira, N. Y., for an Improvement in Stump Machines:

I claim, first, The windlass, C, having two or more sections, a b c, of increasing diameters, in combination with the sliding and adjusting hook, M, and chain, K, in such a manner that the device is adapted to overcome different degrees of resistance by shifting the position of the chain, with economy of labor and time, substantially as herein set forth.

Second, In comination with the cog-wheel, D, provided with lateral ratches, h h. I also claim the detent, N, spring, P, and stop pin, m, arranged substantially as and for the purposes herein specified.

36,888.—G. W. Billings, of St. Paul, Minn., for an Improvement in Rotary Forcing Pumps:

I claim the eccentric revolving cam-whel, B B′, in combination with the stationary cylinder, A A′, and with the adjustable cut-off, F F′, constructed and operating as represented in Fig. 3, also, the stop, G G′, in combination with the cut-off, F F, and the eccentric and connecting rod, D d, and cam-wheel, B B, all operating in the manner and for the purposes substantially as set forth.

36,889.—A. M. Black, of Auburn, Ill., for an Improvement in Cultivators:

I claim the rock-shaft, D, with the plow bars or beams, E E, attached to it, as shown, and connected at their back ends by the cross-bar, F, in combination with the arm, G, and the lever, I, the latter being provided with the arm, J, fitted between cleats or projections, d d, on bar, F, all arranged substantially as and for the purpose herein set forth.

[This invention relates to a new and improved cultivator of that class in which the shovels and plows have a rising and falling as well as a lateral movement. The object of the invention is to obtain a cultivator of the class specified, which will be exceedingly simple in construction, not liable to get out of repair or become deranged by use, and one which may be operated with the greatest facility by the driver on his seat.]

36,890.—J. H. Bloomfield, of Chicago, Ill., for an Improved Furniture Caster:

I claim the peculiar arrangement of the three points, c, in combination with the point, a, when the same are used in combination with the cup and ball of a furniture caster, all being constructed, arranged and operating substantially as and for the purposes delineated and set forth.

36,891.—Seymour Bostwick and C. G. Sargent, of Graniteville, Mass., for an Improvement in Breech-Loading Firearms:

We claim, first, In combination with a breech piece pivoted by a longitudinal slot, a bent spring, G, that will, when the breech piece is released, first, run it back, and then throw it up, substantially in the manner and for the purpose described.

We also claim the arrangement of the breech of the breech piece, locking-lever and trigger lever, when pivoted or yielding, as described, and controlled by their respective springs, as herein set forth, so that a simple touch of the trigger, E, allows the breech piece to be thrown up into loading position.

36,892.—H. H. Christie, of Perch River, N. Y., for an Improved Drag and Cultivator Combined:

I claim the reversible frame, A, provided with the teeth, C, one end being pointed and the other curved, constructed and operating as and for the purposes set forth.

[This invention consists in the arrangement of double-acting teeth, provided on one end with sharp square points, and on the other with curved flat shares, in combination with a reversible frame, in such a manner that said frame when used in one position serves as a drag or harrow, and when reversed it serves as a cultivator.]

36,893.—Edwin Clark, of Lancaster, Pa., for an Improvement in Grinding Mills:

I claim the combination of the disk, tube and vertical shaft, when said shaft passes through both the tube and the hopper, and stirs or loosens the grain or middlings for the purpose of facilitating the feeding of grain or middlings to the stones or buhrs to be ground, substantially as described.

36,894.—G. M. Clements, of Kenduskeag, Maine, for an Improvement in Cultivators:

I claim the frame, A, connected with the draught pole, D, as described and composed of three bars, a a a′, connected together by the rods, d d, and arranged as shown, so that the bars, a a, may be adjusted nearer together or further apart as desired; in combination with the shares, F F, and adjustable rollers, 1 1, all arranged substantially as and for the purpose herein set forth.

[This invention relates to a new and improved implement or device for cultivating crops which are grown in hills or drills, such as corn, potatoes, &c. The object of the invention is to obtain a device by which the crops may be thoroughly cultivated, that is to say, have the earth at each side of the plants plowed and thrown up to them in a manner similar to that performed by the ordinary hand hoe.]

36,895.—D. C. Colby, of Claremont, N. H., for an Improvement in Cultivators:

I claim, first, The arrangement and combination of the rollers, E E, the wheels, F F, and the stirrups, D D, substantially as described and for the purposes set forth.

Second, The arrangement of the plow, H, with relation to the front teeth of the rollers, E E, in the manner and for the purposes set forth.

36,896.—A. C. Currier, of Hallowell, Maine, for an Improved Shot-proof Dome or Cupola:

I claim a shot-proof dome, substantially as and for the purposes described.

Second, I also claim in combination with a dome of this character, the arrangement of rubber, boards, felt, tan, sawdust, or in the place of either, other like material or materials for preventing the reverberation and mitigating the effect of sound, substantially as and for the purposes described.

Third, I also claim the bar for closing the port-hole and the arrangement of the same, substantially as and for the purposes described.

Fourth, I also claim the open floor for such dome, substantially as and for the purposes described.

Fifth, I also claim in combination with the foregoing, the arrangement of cylinders or other form of receptacle, to aid in supplying the dome with air from without, substantially as and for the purposes described.

Sixth, I also claim the arrangement of rubber or other like material between the dome and sides of the vessel to keep out water, substantially as and for the purposes described.

Seventh, I also claim the arrangement of raising the dome to throw out any substances which might impede its working or rotation through friction at the point of intersection with the top of the bulwark, substantially as and for the purposes described.

Eighth, I also claim each and all of the several modes of fastening; first, by flanges on the inner side of the ribs or plates and bolts across; second, the bevelling of the plates, the one inward and the adjoining one outward, at an angle more or less obtuse; and, third, the making of the edges of said plates or ribs, the one concave and the adjoining one convex, on a circle smaller or greater to fit into each other, each substantially as and for the purposes described.

Ninth, I also claim the arrangement of raising the dome by a screw or its equivalent, into the capstan head of which is set the foot of the central shaft of the dome, substantially as and for the purposes described.

36,897.—G. H. Daley and R. M. Treat, of Morris, Conn., for an Improvement in Horse Rakes:

We claim the combination and arrangement of the lever frame, m m′ m′, brackets, n n, link connecting rods, o o, and brake, D D′ D′, with a horse hay rake mounted upon wheels and having a driver's seat, substantially in the manner and for the purposes described.

36,898.—John Davis, of Allegheny City, Pa., for an Improvement in Seed-sowing Harrows:

I claim the rollers, p, and sheath, B, constructed and operated substantially as described, and used in combination with the seed chambers, s, furnished with the inclined bottom, as herein represented and for the purpose set forth.

36,899.—Milton Finkle, of New York City, for an Improvement in Sewing Machines:

I claim the arrangement of the spooler or bobbin winder to swing, and also to move longitudinally on a fixed pin attached to the sewing machine, and occupying a position parallel with the shaft of the machine by which the spooler or winder is driven, substantially as described.

36,900.—Ira Dunham, of Plattsburgh, Mo., for an Improvement in Saddles:

I claim the employment or use of an india-rubber seat, B, provided with a downward projection, d, in combination with a saddle-tree, A, which is furnished with a recess, s, to receive the projection, d, substantially as and for the purpose shown and described.

[This invention consists in the arrangement of a recess in the saddle-tree, in combination with a seat made of india-rubber or other elastic material, and held in place by the ordinary leather or cloth covering of the saddle, in such a manner that the ground-work for the seat with a saddle-tree of the ordinary construction can be dispensed with, and that a strong and durable saddle is produced.]

36,901.—W. H. Doane and W. E. London, of Cincinnati, Ohio, for an Improvement in Combined Planing and Matching Machine:

First, We claim in a combined planing and tonguing and grooving or matching machine, so attaching the tonguing and grooving or matching works that they may be adjusted to a position above or below the top of the planing bed, substantially in the manner and for the purpose described.

Second, We claim in a combined planing and tonguing and grooving or maching machine, the sliding frame or bed, D, with matching works mounted upon it, and operated by the gearing P P O O Q Q and N, so as to raise or lower the matching works above or below the top of the planing bed, all constructed and arranged substantially in the manner and for the purpose described.

Third, We claim in a combined planing and matching machine, the arrangement of the screw shaft v′, sliding bed, D, with matching works, C C, mounted upon it, and the aperture, w, in the closed frame, A, substantially in the manner and for the purpose described.

Fourth, The arrangement of the sliding guard foot, L, and its spring, p, substantially in the manner and for the purpose described.

Fifth, The combination of the lower feed roller, B′, and its boxes, a, with dovetail slots, b, in them, with the dovetail-headed screw bolts, d, and their nuts, e, the whole arranged and operating substantially as and for the purpose described.

Sixth, The arrangement of the checking geared lever segments, I I, constructed as described, in combination with a system of expansion gearing for feed rollers of a planing machine, substantially as and for the purposes described.

36,902.—Constant Gentil, of New York City, for an Improved Spring Bed:

I claim the combination and arrangement of the india rubber rings, B, and interlaced cord or cords, D, substantially as and for the purpose above set forth.

36,903.—W. S. Hadley, of Norwalk, Ohio, for an Improved Guide Attachment for Taps, Reamers, &c.:

I claim the case, A, provided with the tube, B, in combination with a spring, D, and collar or stop, E, applied to a tap or analagous tool, substantially as and for the purpose herein set forth.

36,904.—S. H. Hamilton and C. A. Ashton, of Jacksonville, Ill., for an Improved Ice-cream Freezer:

We claim the combination of the rotary cream receptacle, C, and the rotary beaters, L L′, and frame, M, the latter being placed loosely on the shaft, I, and connected to it by a bolt, a*, and the cream receptacle, C, and shaft, I, rotated from the driving shaft, G, by gearing arranged as set forth.

[This invention relates to an improved ice-cream freezer, of that class in which rotary scrapers and beaters are employed, and it consists in using, in connection with rotary scrapers and beaters, a rotary cream receptacle, operated by means of gearing arranged in such a manner that the cream receptacle will rotate in a reverse direction to the scrapers and beaters, and with a different rate of speed, the parts being so arranged that the beaters and scrapers, either or both, may be rendered inoperative when desired, or as circumstances may require.]

36,905.—S. R. Hawkins, of Beallsville, Pa., for an Improved Portable and Convertible Sheep Rack:

I claim, first, A sectional, folding and convertible sheep rack, constructed substantially as and for the purposes herein described.

Second, The combination of the hinged front of the troughs and the hay rack, substantially as and for the purpose described.

Third, The combination of the hinged lids, sliding supports and sectional rack, substantially as and for the purpose described.

Fourth, The combination of the vertical division grating, c c, slatted hay rack, j j, and sectional box, A A, substantially as and for the purposes described.

36,906.—T. N. Hosmer, of Todd's Valley, Cal., for an Improvement in Spirit Levels:

I claim the securing of the glass spirit or vials of spirit levels, plumbs, grading implements, etc., in their stocks or blocks, by having the boxes in which said bulbs or vials are placed, fitted in recesses in

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the stocks or blocks on a hinge, screw or pivot, and adjusted and secured in proper position by a screw, substantially as herein set forth.

[This invention relates to an improved mode of securing and adjusting the glass spirit bulbs or vials in the stock of the implement, whereby the bulbs or vials may be very readily replaced if broken, and, when fitted in the stock, capable of being adjusted in proper position so that they may answer the purpose for which they are designed.]

36,907.—Hugh Kerr, of Brooklyn, N. Y., for an Improved Tap for Tapping Pipes:

I claim the mode of securing the cutter, B, in the shank or stock, A, as shown and described, by having an opening, b, made transversely through the outer part of the shank or stock, A, and extending out at each end flush with the front end of the shank or stock, and providing the cutter, B, with a recess, e, to receive the part, c, of the shank or stock, in combination with the key, C, substantially as set forth.

[This invention consists in having the cutter of the tap made separately from the shank or stock, and having the former fitted in the latter, in such a manner that the cutter may be very readily detached from the shank or stock, and also readily secured in it, and in a firm substantial manner, so that in using the tap the cutter will not be allowed to work or play in the shank or stock. The object of the invention is to obtain a tap which will admit of having various-sized cutters attached to one shank or stock so that different-sized holes may have screw threads cut in them by simply inserting the proper-sized cutter in the shank or stock.]

36,908.—Neil Macneale and W. B. Dodds, of Cincinnati, Ohio, for an Improvement in Locks:

We claim, first, The combination of two series of concentric rings of corresponding diameters, one behind the other, the one series provided with gates for the passage of the stump, and the other with radial talons to impart rotation from one to another of the concentric rings, the corresponding rings of the two series being connected together in any relative position desired, by notches and tongues substantially as described.

Second, The plate, F, formed with a radial channel for the passage of the stump, and with concentric slots for the reception and guidance of the rings above referred to, when the said plate is fitted in a lock case, A, of the construction described, and held between a shoulder, a′, and cap, B, substantially as set forth.

Third, The combination of the dog, L, fixed stump, O, and sliding stump, K, constructed substantially as described and employed to transfer pressure against any of the rings to a single fixed bearing.

Fourth, The loose longitudinally-sliding or racking stump, K, constructed and operating as herein shown and described.

Fifth, The dog, L, formed with an oblique tooth, l″, to elevate it completely clear of the racking stump, K, by backward pressure upon the bolt, substantially as explained.

Sixth, A stud plate or equivalent device, operating in any manner, substantially as described, to limit the forward motion of the sliding stump, K, and thus permit the descent of the dog into a suitable position to engage with the said stump at the next backward motion.

Seventh, The combination of the hub, C, spud, c, and shaft D, constructed and connected substantially as described, so as to prevent injury to the working parts of the lock by hammering or other violence on the exterior.

Eighth, The notch, m, or equivalent device, employed to permit a certain limited play of the shaft, D, in relation to the inner talon, J, of the ring, I, substantially as explained, in order to compensate for the thickness of the talons.

Ninth, The stud, b2, and notch, b, employed in any manner, substantially as described, to prevent the removal of the cap, B, while the bolt is retracted.

36,909.—Joseph Meyer, of Linden Hall, Pa., for an Improvement in Cultivator Plows:

I claim the cultivator plow, constructed, arranged, made capable of adjustment as to hight, depth, width and draught, and operating in the manner and for the purpose herein set forth.

36,910.—J. H. McGuire, of Rochester, N. Y., for an Improvement in Skates:

I claim the elastic support, B, for the front of the foot, formed by bending the steel bar backward over the runner, and the rigid support, E, for the heels, formed by bending the bar back acutely, and then raising it vertically, when the said supports are disconnected and independent, except through the runner, the whole operating substantially as herein set forth.

I also claim securing the skate to the foot at the rear, by means of the heel piece, K, provided with the broad tongue, h, resting in the corresponding slot, f, of the heel plate, and at the front by means of the screw, l, and nut piece, m, the whole arranged and operating substantially as herein set forth.

36,911.—S. M. Parse, of Newark, N. J., for an Improvement in Elbow Joint Bands:

I claim a joint band when constructed in the manner and for the purpose herein-above specified and shown.

36,912.—Jacob Patterson, of Monroe, N. Y., for an Improvement in Pistons for Pumps:

I claim the combination of the two open adjustable cylinders or sleeves, A B, open ring, c, and packing, F, with the rod, C, valve, E, perforated plate, f, and nut, D, all in the manner herein shown and described.

[This invention relates to an improvement in the packing of the piston, whereby the latter may always be kept in proper working order. The invention consists in the employment or use of annular packing of india-rubber, placed on the box of the piston between a shoulder on the same and a collar or sleeve, all arranged in such a manner that the packing may be compressed at any time, and expanded so as to work perfectly tight within the pump cylinder.]

36,913.—Charles Pontez and C. L. McAlpine, of New York City, for an Improvement in Forming Sub-Foundations. Antedated May 11, 1862:

We claim the method of forming sub-foundations as herein shown and described, which consists substantially in extending the foundation from within the tube, as set forth.

36,914.—S. O. Post, of Chicago, Ill., and E. J. Post, of Vienna, N. J., for an Improvement in Axles and Reaches for Vehicles:

We claim the application of corrugated sheet metal to bars or bolsters, for wagon axles, and the mode of securing the arms to the same, in the manner described, and for the purposes herein specified.

36,915.—Squire Raymond, of Venice, N. Y., for an Improvement in Horse Pitchforks:

I claim the fork arms, D D, attached by pivots or joints to the pulley frame, B, in combination with the arms or levers, E E′, secured in the fork arms, D D, by pivots, f′ f″, and connected at their inner ends by a pivot, f*; the lever, E′, being provided with an extension, g, and all used in connection with the rope, F, and cord, J, arranged as and for the purpose set forth.

[This invention relates to a new and improved device for elevating hay, straw and other substances into lofts or mows by the aid of a horse, and is designed to supersede the ordinary hand pitchfork originally used for that purpose, and also to supersede those hitherto devised to be operated by a horse. To this end the invention consists in attaching by joints two fork arms to a pulley frame, and connecting the fork arms by levers; all arranged in such a manner that the hay or other substance to be elevated may be raised with the greatest facility over or to the desired spot, and then discharged from the forks by a very simple manipulation of the operator.]

36,916.—Nathaniel Richardson, of Byberry, Pa., for an Improvement in Coupling Thills to Axles:

I claim retaining the coupling bolt, C, in place, and preventing its rattling, and at the same time allowing it to be easily and expeditiously inserted or removed, by means of the retaining spring, D, resting against it, and the coiled spring, c, or its equivalent, re-acting to throw it outward, the whole being arranged, combined and operating substantially as herein set forth.

36,917.—A. T. Schmidt, of Pittsburgh, Pa., for an Improved Apparatus for Burning Liquids lighter than Water:

I claim the mode hereinbefore described of employing carbon oil, coal oil and other similar fluids or compositions of fluids as fuel for furnaces, fireplaces, &c., by passing it through water, on the surface of which it is ignited, in the manner and for the purposes hereinbefore described.

The use of apparatus for burning carbon oil and other similar fluids as fuel, consisting of a firebox supplied with water and oil or other burning fluid, by means of pipes, from suitable reservoirs of those fluids.

The use of apparatus for burning carbon oil and other similar fluids as fuel, consisting of a firebox hung on pivots or gimbals, and having projections inside to prevent the overflow of the water, combined with a fire chamber inserted in the firebox, so as to be immersed in the water, thus confining the oil or burning fluid within the fire chamber, substantially in the manner hereinbefore set forth.

36,918.—L. M. Severance, of Dixon, Ill., for an Improvement in Platform Scales:

I claim the combination of the parallel beams, B B, and levers, D′ D′ D″ D″′ and I, and the scale beam, L, all arranged as herein set forth.

The object of this invention is to obtain a platform scale which will be extremely simple in construction and capable of being manufactured at a comparatively small expense and, at the same time, be durable, not liable to get deranged by use and be compact and portable.]

36,919.—F. G. Shalling, of Somerset, Mass., for an Improvement in Locks:

I claim the combination of the tumblers, B, stop, E, and plate, H, with the springs, c G, applied respectively to the tumblers and stop, and all arranged to operate as and for the purpose herein set forth.

[The object of this invention is to obtain a lock of simple and economical construction, which cannot be picked or illegitimately opened, and which may be applied to doors, drawers, trunks or used in any case where a lock can be applied.]

36,920.—Jesse Sinclair, of Davenport, Iowa, for an Improved Animal Shoeing Stock:

I claim, first, The lifting bars, G, and girts, J J′ and K K′, in combination with the cords, d, windlasses, F F′, gear wheels, n o, and winch, m, when arranged to operate in the manner and for the purpose specified.

Second, The foot rest, H, shaft, f, and lever, g, in combination with the arm, L, and rings, i, when arranged to operate in the manner specified.

[This invention is more especially designed for shoeing vicious or fractious horses and mules, though it is well adapted to shoeing other kinds of stock. It consists, first, in a device for lifting the animal bodily off his feet; and, secondly, in devices for supporting his feet while shoes are being fitted on one or more of them at once.]

36,921.—H. B. Slaughter, of Crumpton, Md., for an Improvement in Preserving Fruits, &c., in Sealed Cans:

I claim, in the process of preserving fruits, meats, &c., in hermetically sealed cans or jars, leaving an opening or openings in the can or jar, and immersing it in sirup or other liquid, and boiling it thus immersed or submerged, so that the sirup or liquid may circulate through the fruit or other contents of the can or jar, substantially as herein described.

36,922.—C. W. Taliaferro, of Keithsburgh, Ill., for an Improvement in Cultivators:

I claim, first, The plow beams, G, connected at their front ends by universal joints, d, to pendent supports, I, at the front part of the frame, A, and provided at their back ends with journals, c, which are fitted in pendent guides, H, at the back end of the frame, A, in combination with the uprights, h, j, bar, L, and rock shaft, M, with treadle or foot-piece, N, attached, all arranged as and for the purpose set forth.

Second, The rotary shield or guard formed of the two wheels, Q Q, provided with radial teeth or rods, m, and attached to the bar, P, which is connected to the draft pole, B, by the links, l l, substantially as and for the purpose set forth.

[This invention consists of a series or gang of plows placed in a mounted frame and arranged in such a manner that they may be readily raised and lowered, and also adjusted or turned either to the right or left, as circumstances may require. The invention also consists in the employment or use of a rotary shield or guard, constructed, arranged or disposed in such a way as to operate in the most efficient manner in protecting plants from clods of earth cast up by the plows.]

36,923.—Hiram Storms, of Ann Arbor, Mich., for an Improvement in Carding Engines:

I claim furnishing the fancy cylinder of a carding machine with emery-coated strips or grinding surfaces of similar character, arranged in the spaces between the cards, substantially as herein specified.

[The object of this invention is to obviate the difficulty experienced in carding from the teeth getting dull and the necessity of stopping the machine from time to time to grind them; to this end it consists in inserting in the spaces between the cards of the fancy cylinder strips of wood or other material coated on their faces with emery. These emery-coated faces, being even with or very slightly below the tops of the teeth of the fancy, and moving at a higher velocity than the tops of the teeth of the main cylinder, keep the teeth of the said cylinder always ground and sharp, and will also grind the doffer if the latter be raised to work in contact with it.]

36,924.—M. H. Smith, of Four Corners, Ohio, for an Improved Apparatus for Evaporating Saccharine Liquids:

I claim, first, The arrangement of the pans, B C D E, provided with transverse partitions, b′ c′ d′ e*, and communicating with each other by faucets, f g h, or their equivalents, in combination with the main furnace, A, and the side furnace, G, all constructed and operating as and for the purpose described.

Second, The arrangement of the central apertures, e, and side apertures, e′, in the partitions, b′ c′ d′ e*, of the pans, B C D E, as and for the purpose specified.

36,925.—Franklin Wesson, of Worcester, Mass., for an Improvement in Breech-loading Fire-arms:

I claim the combination of the double-slotted oscillating link, D, and pins, h l, with the frame, A, and barrel, C, in the manner herein shown and described.

Second, The combination of the tongue, m, with the locking bolt, E, as herein shown and described.

[This invention relates to that class of breech-loading fire-arms in which the opening and closing of the breech is provided for by an upward and downward swinging movement of the barrel on a transverse pin which attaches it to the frame. It consists, first, in a slotted slide link constructed and applied in connection with the barrel and frame, to limit the upward movement of the rear end of the barrel, by which the opening of the breech is effected, and prevent any jarring or straining of the pin, which attaches the barrel to the frame, from being produced by the sudden raising of the rear end of the barrel by the spring applied below it for the purpose. It also consists in a mode of combining with the barrel and with the tumbler of the lock, the bolt which locks the barrel in position to close the breech, whereby the unlocking of the barrel is only permitted when the hammer is at half-cock. And it further consists in the beveling of the rear end of the barrel, on opposite sides of the bore, in such a manner as to provide for more easily taking hold of the cartridge shells with the fingers, for the purpose of withdrawing them from the barrel.]

36,926.—P. D. Wesson, of Providence, R. I., for an Improvement in Evaporators for Saccharine and other Liquids:

I claim the application of a steam trap, E, to the steam jacket, B, when the latter is used in combination with an evaporating pan, A, substantially as and for the purpose herein specified.

[This invention relates to an improvement in that class of evaporators in which the liquid is heated by means of a steam jacket and the evaporation facilitated by the action of a series of rotary disks. The invention consists in the application to said steam jacket of a steam trap of any desirable construction, in such a manner that, by the action of said trap, the temperature in the interior of the steam jacket is not permitted to exceed certain limits either up or down, and consequently all burning or over-heating of the liquid is avoided, and by maintaining a uniform temperature the evaporation is considerably facilitated.]

36,927.—R. T. Wilde and S. H. Lyon, of Brooklyn, N. Y., for an Improvement in Dies for Forming Hats:

We claim the construction of the upper die with a cavity, c, so formed in its face that it acts upon the upper surface of the brim of the hat, only close to the sides of the crown, and at the margin thereof, but yet confines the heat to the said surface, substantially as and for the purpose herein specified.

36,928.—J. M. Woodcock, of Bridgeport, Ohio, for an Improvement in Horse Rakes:

I claim the combination of weights with the rake bar so that the teeth may be lifted with ease off from the ground, or may be operated automatically, substantially in the manner as herein shown and set forth.

I also claim the use of spring clearers or discharges, in combination with spring rake teeth, the two being arranged to operate in conjunction with each other in the manner and for the purpose set forth.

I also claim the herein-described device for locking at any required elevation from the ground, of the rake bar, the same consisting of a curved ratchet bar fast on and movable with the tilting rake bar, in combination with a mortise and spring latch fast on the axle, the said parts being arranged as described to operate in the manner herein set forth.

36,929.—William Workman, of Ripon, Wis., for an Improvement in Broad-cast Seeding Machines:

In combination with the convex, rounded scatterers, M M, I claim the conductors, L L, the bottom discharge opening thereof being formed of narrow oblong shape longitudinally of the scatterers, in order to direct the seed to the center of the same, and thus insure its proper and equal dispension at all times, constructed and arranged as herein set forth.

I also claim the teeth shanks, P P, provided with adjusting holes, n n, and with the rearwardly projecting forks, r r, in combination with the bars, O O, the whole arranged so that the said shanks are braced against obstructions, and so that they may be set at different angles, constructed and arranged as herein described.

36,930.—G. C. Worth, of Upper Sandusky, Ohio, for an Improved Rein Guard for Horses:

I claim, first, The application of a light frame, plate or guard to the rear part of the harness or horse, or to the reins or lines, when said frame, plate or guard shall extend over a part or the whole of the horse's dock, and over or through which said frame, plate or guard the reins or lines pass.

Second, I also claim the combination of the frame, A, with the loop, B, or its equivalent, as and for the purposes described: and this I claim whether the said frame be covered with cloth or net-work or not, or whether the said frame be made wholly or in part of india-rubber or other elastic gum.

Third, I further claim the frame, A, and loop, B, in combination with the eye or eyes, G and G′, either with or without the cloth or net-work covering, I, substantially as and for the purposes set forth.

36,931.—J. O. Clay (assignor to F. C. Gridley), of Hudson, Wis., for an Improvement in Weather Strips:

I claim the combination of the tappet, e, with the hinged plate, C, and strip, b, in the manner herein shown and described.

36,932.—James A. and Henry A. House (assignors to themselves and A. G. Seaman), of Brooklyn, N.Y., for an Improvement in Sewing Machines:

We claim, first, The combination of an eye-pointed needle, working up from below the table, and penetrating the fabric with a thread carrier, also working up from below and penetrating the fabric, substantially in the manner described, for the purpose set forth.

Second, Mounting the entire stitching mechanism upon an independent skeleton frame or disk, having a periodical intermittent rotary movement imparted to it, substantially in the manner described, for the purpose set forth.

Third, The combination of a bed-plate upon which the material to be sewn is clamped, having a periodical intermittent progressive motion in a rectilinear path, and in alternately opposite directions, with an independent disk or frame, carrying the stitching mechanism and having an occasional intermittent rotating movement in one direction, when co-operating, substantially in the manner described, for the purpose of working automatically both sides and the eye of a button-hole, as herein set forth.

Fourth, The combination of a stitching mechanism, substantially such as described, with a bed-plate or table upon which the fabric rests, in such manner that the whole of the entire mechanism shall be beneath the bed-plate, as herein described.

Fifth, The combination of an eye-pointed needle with a shank o curved or bent, that the needle shall move parallel to the shank and carry its loop through the fabric, while the shank vibrates near the edge thereof, substantially in the manner described, for the purpose of sewing over the edge of a fabric, as herein set forth.

Sixth, The curved finger or thread carrier, n, when arranged and operating substantially as and for the purpose specified.

Seventh, The combination of the inclined shaft, N, of the thread carrier when made to rest in open bearings, with a retaining spring, n2, substantially as described, for the purpose set forth.

Eighth, The combination of the cam, O, inclined shaft, n, and needle mandrel, K, when co-operating, substantially in the manner and for the purpose described.

Ninth, The combination of the rotating disk, G, and stitching plate, M, as and for the purpose described.

Tenth, The combination of the stitching plate, M, and tension post, m, substantially as and for the purpose described.

Eleventh, The combination of the spool cases, P P′, disk, G, needle, l, and thread carrier, n, when arranged and operating substantially in the manner described.

Twelfth, The combination of the spool case, P, tension post, R′, adjusting spring, S, and thread carrier, n, substantially as described, for the purpose of regulating the position of the pearl, as set forth.

Thirteenth, The combination of the sliding frame, B, and traversing screw, E, substantially in the manner and for the purpose set forth.

Fourteenth, The combination of the rotating disk, G, with the friction springs, T, substantially as and for the purpose described.

Fifteenth, The combination of the adjustable guide bar, I 2, and fixed bar, I′, with the sliding frame, B, substantially in the manner and for the purpose described.

Sixteenth, The combination of the guide bars, I′ I 2, with the stop lever, I, and spring pawl, h3, substantially in the manner and for the purpose described.

Seventeenth, The combination of the shifting lever, U, with the rotating disk, C′, substantially in the manner and for the purpose described.

Eighteenth, The combination of the pusher, h, ratchet wheel, H, and spring pawl, h3, substantially in the manner and for the purpose described.

Nineteenth, The combination of the groove, V, on the bed-plate, with the stop pin, v′, on the disk, substantially as and for the purpose set forth.

Twentieth, The combination of the two sections, G G′, of the disk, when connected and co-operating substantially in the manner, and for the purpose described.

Twenty-first, The combination of the tension posts, R R′, with the disk, G, when arranged beneath the same, as and for the purpose described.

Twenty-second, The shield or thimble, M′, to protect the needle, to bear upon the fabric, and to retain the gimp in position, substantially in the manner described.

36,933.—Abel Putnam, Jr., of Chester, Vt., for an Improvement in Spring Hooks for Fastening Garments:

I claim a spring hook or fastening, A, formed of a piece of wire doubled and bent, as shown, in combination with the button or head, B, or ring, C, or other equivalent, for the purpose specified.

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36,934.—Alfred Berney, of Jersey City, N. J., for an Improved Liquid-fire Shell or Projectile :

I claim the composition for filling shells, composed of the materials and in the proportions substantially as set forth.

I also claim, as a new manufacture, a fire shell, composed of a hollow shot, A, strong tube or chamber, C, for the bursting charge of powder, and the filling, B, all substantially and for the purpose set forth and described.

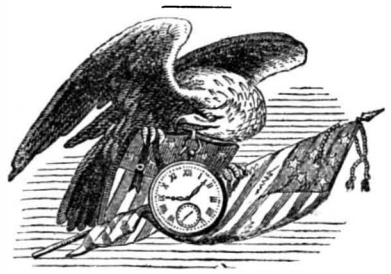
DESIGNS.

E. J. Ney, of Lowell, Mass., for Eight Designs for Carpet Patterns.

G. B. Owen, of New York City, for a Design for a Clock Case.

NOTE.—In the above list of patents issued for the week ending Nov. 11th, we recognize the names of TWENTY-FOUR patentees whose applications were conducted through this office.

PATENTS FOR SEVENTEEN YEARS.



The new Patent Laws enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from $30 down to $15. Other changes in the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting reference to such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN ; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years. Address MUNN & CO., No. 37 Park-row, N. Y.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention is susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co., No. 37 Park-row, New York.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief story of the case, inclosing the official letters, &c.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats, in English and German, furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

Notes and Queries

O. C., of Ohio.—You state that the nitrate of silver solution, which you have applied to color your hair black, has, to your regret, converted it into a red color and you wish to have this remedied. We advise you not to be downcast on account of the red color of your hair. This was the favorite color of the old Romans, and as our republic is proud to copy after its grand old prototype, you may consider red hair as an indication of high blood. We cannot give you further information on this subject than to state that nitrate of silver is the basis of all the most common hair dyes. One ounce of nitrate of silver to one pint of rose water is a common preparation. The hair must be well washed to free it from grease, and then dried before the nitrate of silver solution is applied. It requires several hours exposure to light before it is fully developed. Another method of dying the hair black consists in using a mordant as follows :—Dissolve 1 ounce of fresh sulphuret of potassium in 6 ounces of water, and apply it first to the hair and allow it to become nearly dry. Then apply a solution of 1 ounce of nitrate of silver dissolved in 6 ounces of water, and expose it to light. The sulphuret must be fresh or kept in well-stoppered bottles or the hair instead of becoming black will assume a greenish color. In addition to this information we will venture to say that as a general rule we are opposed to the use of all hair-dyes. Few people fail to detect the artificial coloring, and it is generally thought to be an evidence of pride or vanity, which are unbecoming habits in old or young. If persons will, however, insist upon dyeing their locks, they ought to lay on the coloring matter very carefully. It ought to be done by some one experienced in the art.

H. H., of Wis.—In your letter, taking exceptions to the mechanical theory of heat, as set forth in Professor Tyndall's lecture, which was published in our columns, you do not seem to be aware of the investigations and careful experiments of Mr. Joule. There seems to be a misapprehension on your part of his labors. Between the years 1843 and 1850 Mr. Joule experimented on the friction of oil, water, mercury, air and other substances, until he determined the mechanical equivalent of a unit of heat. This means the number of foot-pounds of mechanical energy which must be expended to raise the temperature of one pound of water one degree. For Fahrenheit's degree, that quantity is 772 foot-pounds. This is now called "Joule's equivalent."

J. B., of N. Y.—We receive United States Treasury notes in payment of Patent Office and Agency fees on all applications made to us for patents.

M. H. G., of Maine.—By referring to the description accompanying the cut of the invention in question, you will find the information you desire.

J. E. H., of Oxford.—Brown's *Taxidermist's Manual* will give the information you need. It is sent postpaid for one dollar, by John Wiley, bookseller, 56 Walker street, New York city.

F. A. R., of Md.—We do not know of any $5 sewing machine that we can recommend. Such advertisements are generally of the catch-penny order. A sewing machine fit for family use can not be made for any such sum.

R. H., of Conn.—The first section of the Act of March 2d, 1861, makes provision for the attendance of witnesses before a commissioner for the purpose of taking their testimony in patent cases. No witness however, is required to attend at any place more than forty miles from the place where the subpœna is served upon him.

Money Received

At the Scientific American Office on account of Patent Office business, from Wednesday, November 12, to Wednesday, November 19, 1862 :—

M. B. D., of Pa., $40; J. T., of N. Y., $40; G. S., of Mass., $40; M. H. F., of N. Y., $40; J. J., of N. Y., $20; W. D. A., of N. Y., $45; J. J. M., of Conn., $20; C. B. L., of Mass., $20; G. R., of N. Y., $20; T. H. R., of N. J., $20; M. & J., of N. Y., $20; G. & C., of Iowa, $20; S. B. E., of Conn., $12; G. W. H., of N. H., $15; D. H. T., of Md., $25; W. W. W., of N. Y., $22; C. & W., of Ind., $25; J. W., of Ky., $12; C. W. P., of N. Y., $25; N. A., of Conn., $15; W. F. Q., of Del., $15 W. J. D., of N. Y., $15; T. N., of Conn., $35; A. A., of Ill., $40; J. A. K., of Wis., $25; McL. & S., of Cal., $12; L. G., of N. Y., $15; M. N. F., of Ill., $15; J. F. T., of N. Y., $15; G. A., of Mich., $53, J. L. P., of N. Y., $25; J. G., of N. Y., $15; W. & R. F., of N. Y., $135; P. D., of Iowa, $25; S. W., of N. Y., $20; F. D. D., of Ohio, $25; I. B., of Iowa, $25; C. G. S., of Mass., $25; S. D., of Pa., $30; I. W., of Mass., $15; T. C. F., of N. Y., $25; S. F., of N. Y., $25; T. P., of N. Y., $30; H. G. P., of N. Y., $12.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from November 12, to Wednesday, November 19, 1862:—

M. B. D., of Pa.; G. S., of Mass.; C. G. S., of Mass.; J. B., of Ind.; T. C. F., of N. Y.; S. F., of N. Y.; S. W., of N. Y.; F. D. D., of Ohio; P. D., of Iowa; McL. & S., of Cal.; L. D. B., of N. J.; J. A. K., of Wis.; W. W. W., of N. Y.; J. W., of Ky.; S. B. E., of Conn.; T. P., of N. Y.; G. B. McD., of Ky.; W. R. G., of N. Y.; C. & W., of Ind.; D. H. T., of Md.; C. W. P., of N. Y.; G. E., of Ohio; W. S., of Mich.; T. N., of C. W.; H. G. P., of N. Y.

RATES OF ADVERTISING.

Twenty-five Cents per line for each and every insertion, payable in advance. To enable all to understand how to compute the amount they must send in when they wish advertisements inserted, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns ; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable

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INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their Inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no secondhand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

For further particulars, address—

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Publishers of the SCIENTIFIC AMERICAN,
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VOLUMES I., II., III., IV., V., VI. (NEW SERIES) COMplete (bound or unbound) may be had at this office and from all periodical dealers. Price, bound, $1 50 per volume, by mail, $2—which include postage. Price, in sheets, $1. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. Numbers 3, 4, 6, 8, 9, 10, 11, 12 and 16, of Vol. VI. are out of print and cannot be supplied.

Binding the "Scientific American."

It is important that all works of reference should be well bound. The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides, covered with marble paper and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we shall commence on the expiration of this present volume to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style will be 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, 37 Park Row, New York.

ATTENTION, MASONS AND MECHANICS—AGENTS wanted. I will send (as sample) on the receipt of $1, a handsome Gold Masonic Pin or Ring, or Gentleman's Clustre Pin with Chain attached, or New Style Scarf Pin, or Plated Vest Chain, or a Fine Gold Pen and Pencil, or Engraved Locket or Bracelet, or Neck Chain, or a beautiful set of Jewelry, together with my wholesale circular. C. P. GIRTON, Manufacturing Jeweler, 208 Broadway. 22 10*

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HAMILTON E. TOWLE, CIVIL AND MECHANICAL Engineer Office, 156 Broadway, New York. 17 tf

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INCRUSTATION IN BOILERS—A POSITIVE REMedy. Winans's Anti-Incrustation Powder, seven years in successful use, without injury. This should give it preference over new and unknown mixtures lately put in the market. References, George Shield, Miles Greenwood and others in Cincinnati; American Bank Note Company, &c., New York; and over 1,000 more throughout the country. Circulars on application to H. N. WINANS, Box 6, P. O., New York. 21 7*

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In Politics it is entirely free from party relations or affinities, discussing great principles with freedom and candor, and giving the fullest and latest intelligence of all the movements of the day. It supports the Government with vigor, fidelity and zeal, in its efforts to crush the rebellion and restore the Union and preserve the Constitution. It criticises with freedom whatever measures are not adapted to the accomplishment of these ends; but its steady purpose, from the beginning of the war, has been, and will be, to uphold the hands and strengthen the heart of the Government, while it puts forth its energies to protect us against the most unholy rebellion that ever disturbed the peace of any country.

The N. Y. Observer is the most complete family newspaper in the world. In the variety of its Departments, in the fulness of its Information, in the extent of its Correspondence, in the number of minds enlisted in its Editorial and other columns, in the amount of money expended in procuring materials to enrich and adorn its pages, in the healthful, religious, conservative, genial tone that pervades the paper. In its stores of anecdote, biography, poetry, science, art and general literature, it will strive to exceed every other weekly paper.

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The proprietors of the New York Observer offer the following valuable premiums for new subscribers. In all cases, the new subscribers must be those who have not in their own or others' names taken the paper during the past year.

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TO MUSKET MANUFACTURERS.—A MACHINE FOR turning and cutting the thread on the breech pin of the Springfield Rifled Musket, just finished and for sale by J. R. BROWN & SHARPE, Providence, R. I. 17 tf

THE CRAIG MICROSCOPE—PATENTED FEBRUARY 18, 1862, magnifying 100 diameters or 10,000 times, yet so simple that a child can use it. Sent by mail, postage paid, on receipt of $2 25. Liberal discount to the trade. Address HENRY CRAIG, 182 Centre street, New York City. Eight mounted objects will be sent for $1. 21 5*

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TO PHOTOGRAPHERS.—IMPROVED PHOTOGRAPHIC Camera, Patented March 25, 1862, by A. B. WILSON (Patentee of the Wheeler and Wilson Sewing Machine), adapted to all photographic work; such as Landscapes, Stereoscopic Views, Carte Visites, Ambrotypes, &c. Can be used by amateurs and others from printed directions. Send for a circular. Address A. B. WILSON, Waterbury, Conn. 16tf

DAMPER REGULATORS.—GUARANTEED TO EFfect a great saving in fuel, and give the most perfect regularity of power. For sale by the subscribers, who have established their exclusive right to manufacture damper regulators, using diaphragms or flexible vessels of any kind. Orders promptly attended to, or information given, by addressing CLARK'S PATENT STEAM AND FIRE REGULATOR COMPANY, 229 Broadway, N. Y.
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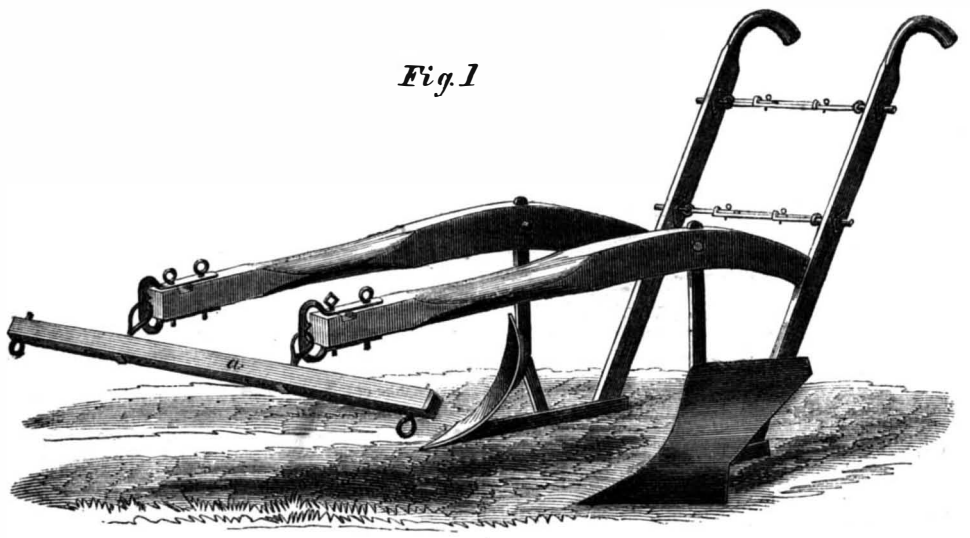
An Improved Double Plow and Cultivator.

The accompanying engravings illustrate an improvement in coupled plows and cultivators, which we venture to predict will come into very extensive use. Connecting plows together so as to turn two or more furrows at one passage of the team and plowman across the field has long been practiced. On the smooth prairies of the West gangs of plows have been formed by simply morticing the ends of the beams into the axle of two wheels, to which the team was attached, but for uneven ground it is necessary to have the plows connected by means of rods with joints at their ends so that the plows may be guided by rolling. The invention here illustrated consists in certain modifications of the latter plan of connecting plows.

Fig. 1

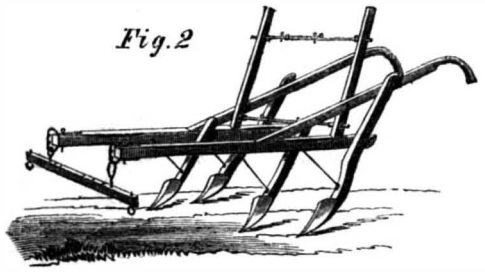


OWEN'S DOUBLE PLOW AND CULTIVATOR.

The rods are so constructed that they may be varied in length, and thus the distance apart of the plows may be adjusted to suit the kind of work to be performed. To effect this each coupling rod is made in two parts as shown in Fig. 5. The lower one of these parts is attached at one end by an eye-bolt to one plow, and its opposite end is fashioned into a band which loosely embraces the upper part. The upper part is attached in the same manner to the other plow, and passes loosely through the band on the end of the lower part. The two parts are held together by a thumb-screw, *b*, which passes through the end of the upper part and enters one of the holes in the lower part; a series of these holes being formed throughout the whole length of the lower part, by which the distance of the plows from each other may be adjusted at will.

The coupling bar, *b*, Fig. 1, at the ends of the beams, is also provided with a number of holes so that the distance of the ends of the beams apart may be adjusted in the same way.

Fig. 2



For cultivating corn early in the season when the plant is small, two plows—one turning a furrow to the right and the other to the left—are coupled together so that they will throw the furrows apart and run through the field, one upon one side of the row and the other upon the opposite side—the team also walking astride of the row. At the next plowing the position of the plows is reversed so that they will throw the furrows towards each other, and they are placed a little further apart when the soil is thrown back around the corn.

The inventor claims that this throwing of the soil against both sides of the plant at the same time prevents the corn from being knocked down, and that this is quite an important advantage.

For plowing later in the season, when the plant is larger, the plows are coupled as represented in Fig. 3, the coupling rods being bent upward in the middle or placed at such hight as to pass over the corn without injuring it.

For laying out ground the plows may be placed at the proper distance apart for the furrows, and in this case the coupling rod is made in three parts, the joints being formed in the same manner as when only two parts are used.

Shovel plows may be connected on this plan as shown in Fig. 2.

Plows connected in this way may be disconnected and used singly; in which case the second handle is attached to a piece, *c*, secured to the side of the beam as shown in Fig. 4.

If plows thus connected are properly handled the labor will be found easier for the workman than working with single plows. No power must be applied to pushing the plows either forward or sideways, but they must be simply rolled to guide them in the desired direction.

The patent covers the connection in this manner of two or more plows, and it will be seen that the advantages apply to gangs as well as to couples.

Fig. 3

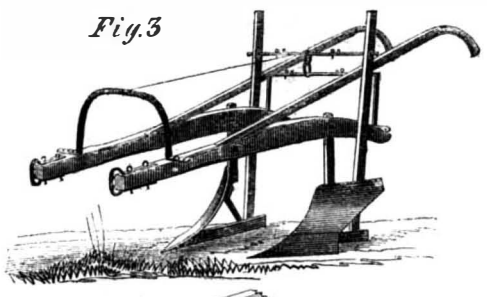


Fig. 4

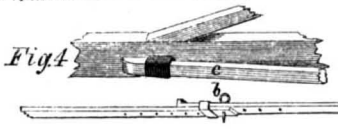


Fig. 5

The patent for this invention was procured through the Scientific American Patent Agency, and further information in relation to it may be obtained by addressing the inventor, George Owen, at Jacksonville, Ill.

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